

# *The* MINING CONGRESS JOURNAL



FEBRUARY

1934

The LOG BOOK OF COLUMBUS

Reads as follows:

Sept. 29 WE SAILED DUE WESTWARD

Sept. 30 WE SAILED DUE WESTWARD

Oct. 1 WE SAILED DUE WESTWARD

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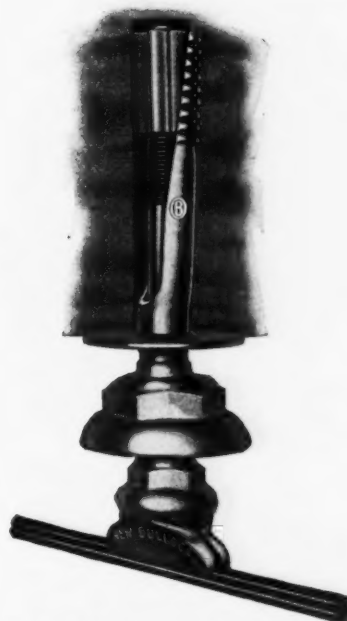


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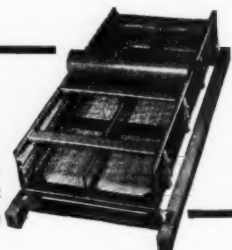
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FEBRUARY

1 9 3 4



NUMBER 2

VOLUME 20

	Page
HOLD FAST THAT WHICH IS GOOD.....	7
EDITORIALS .....	9
STILL NEED FOR A PROTECTIVE TARIFF.....	10
<i>by Hon. Frank E. Crowther</i>	
THE NATIONAL CLAY MINING INDUSTRY.....	12
<i>by George C. Crossley</i>	
COPPER INDUSTRY OF ARIZONA—PRESENT AND FUTURE .....	13
<i>by Ross D. Leisk</i>	
RECENT DEVELOPMENTS CONCERNING INTERNATIONAL DOUBLE TAXATION.....	15
<i>by James N. Knapp</i>	
WHEELS OF GOVERNMENT .....	17
POWER DISTRIBUTION FOR ANTHRACITE COAL MINES .....	19
<i>by C. H. Mathews</i>	
HAULAGE AND HOISTING AT THE MINES OF THE INSPIRATION CONSOLIDATED COPPER CO....	20
<i>by A. C. Stoddard</i>	
A COMPLETE PANEL MINING WITH CONVEYORS. ..	22
<i>by Richard Todhunter</i>	
MILLING METHODS AT THE LEAD-ZINC CONCENTRATOR OF THE INTERNATIONAL SMELTING CO. ....	24
<i>by W. J. McKenna</i>	
RELATION BETWEEN POWER COSTS AND TONNAGE MINED .....	27
<i>by W. E. Wolfe</i>	
ROOF CONTROL .....	29
<i>by Raymond E. Salvati</i>	
HAS MECHANIZED MINING BROUGHT SAFER COAL MINING? .....	31
<i>by Lyman Fearn</i>	
MINING EVENTS.....	33
ACCIDENT-PREVENTION RECORD OF THE METAL-MINING INDUSTRY.....	44
BUREAU OF MINES—COMMITTEE ACTIVITIES...	46
PERSONALS .....	48
HAVE YOU HEARD?.....	49
NEWS OF MANUFACTURERS.....	52

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# Hold Fast That Which is Good

MANY years ago, a London wag made a wager that within twenty-four hours he could set all London wondering. The following morning found posted the letters Q. U. I. Z. from blank walls, upon smokestacks and every conspicuous place about the city. The wag won his wager and a new word was coined for the English language. The fogs of London were not more bewildering than the atmosphere of Washington while considering the monetary bill, which called from a distinguished Congressman the following statement, "I feel like I am at sea, adrift in the fog without a compass, and I am singing 'Lead Kindly Light.' I am for this bill." And from another distinguished representative a short time later we heard this statement, "The old order is passing away, vanishing as it were before this onward march of human progress."

Can it be that everything in the past was wrong and that the foundations upon which this nation were builded are to be abandoned? Must we, looking back upon that small span of world history which has developed here the greatest nation in the world, inquire, "Can any good thing come out of Nazareth?" Have all things been wrong?

Is the gold standard upon which the enormous war credits were based entirely without merit? Were the policies all wrong upon which the greatest nation of the world was builded in the shortest time? Or, may we not better seek to find that weakness which brought disaster and preserve those principles which seem to have had merit? May we not examine some of the theories upon which our present policy is based, without being suspected of treason? Would it not be treasonable to neglect such inquiry when all admit inability to see through a maize of unprecedented activities, concerning which all admit lack of understanding?

Forward-looking men are always to be commended but the name of a very wise statesman in revolutionary days has gone down through history largely because of his statement, "I know of no light to guide my path except the lamp of experience." Shall we provide for a still greater abuse of credit than that which was a major factor, to say the least, in the world-wide business depression?

From the discussions of the gold standard one might be led to suspect that prosperity could not exist upon that basis. Have we forgotten the prosperity from 1920-1929? Have we forgotten the business activity preceding the panic of 1907? Have we forgotten that the years preceding 1893 were years of unusual prosperity? And are we unable to discern that upon each of these occasions the public had been led by overstimulated business to plunge into wild speculation made possible by unjustified credit superimposed upon a foundation of gold too small to bear this burden? In June 1929 the deposits in the banks of the United States amounted to \$53,000,000,000, of which \$24,350,000,000 were commercial deposits subject to immediate withdrawal, and savings deposits \$28,788,000,000 subject to withdrawal after short notice. At that time the total money supply of the United States was \$11,000,000,000 backed by \$4,000,000,000 in gold.

Was it any wonder that those speculators wise enough to profit on either a rising or falling market, believing that the upraise of prices could not continue began to hedge and thus brought collapse to the bubble of credit represented by the \$42,000,000,000 of the above mentioned bank deposits? In 1907, with a total gold

reserve of one and three-quarter billion dollars, we had builded a bubble of credit too great for its foundation. At that time every man desiring work was employed at the highest wages ever before paid in the history of this or any other country, every wheel of industry was in full motion when someone pointed a finger of distrust at this bubble of credit and the business depression of 1908 followed.

With certain variations these same conditions prevailed in 1873 and 1893. The abuse of credit was always present. This country because of its great wealth and its resourcefulness can survive a moderate abuse of credit but there is a limit, as these several depressions demonstrate, beyond which inflation means disaster.

There is not enough gold in the world with which to transact its business properly. To do the world's business requires a credit which our present basic structure of gold will not support in time of stress. Recent history proves conclusively the truth of this statement. The bold and startling proposal to double the value of gold by proclamation and the largely increased world market price of gold both demonstrate a world need for increased basic support of credit. If, however, we double the estimated value of our metallic reserve (either by a return to the use of silver in our monetary reserves or by doubling the value of gold) do we not make possible a doubling of the amount of credit money, a doubling of the opportunity for wild speculation and thus add to the force of the downfall when the inflated balloon of credit collapses?

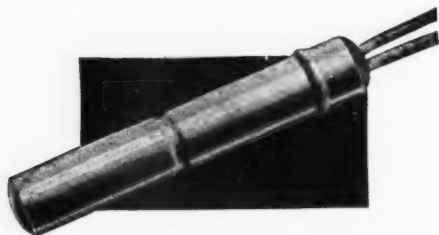
The importance of such limitation is shown by the statement of Owen D. Young before the Senate Banking and Currency Committee, that the four billions of new(?) gold value supposedly created by the administration's gold revaluation bill will furnish a basis for forty billions of additional credit. This added to our present credit would create the most startling inflation ever known in this country.

The financial structure of our government requires a 40 percent metallic backing for its paper money. This rule within reasonable limits has prevented any undue governmental inflation. Why is it not feasible to require banks to maintain a 40 percent cash reserve against its discounts? This in 1929 would have limited our credit to \$27,500,000,000 as against the 53-billion dollars credit which wrecked the country.

To increase our circulating medium is so important as to be almost a necessity. To permit a proportionate expansion of credit based on such increased currency will be almost suicidal. Let us increase our real money and limit our deposit money. Let us build upon a solid foundation of metallic reserves and from this time on plan for a credit commensurate with stable business conditions but so limited as to prevent the abuse of credit.



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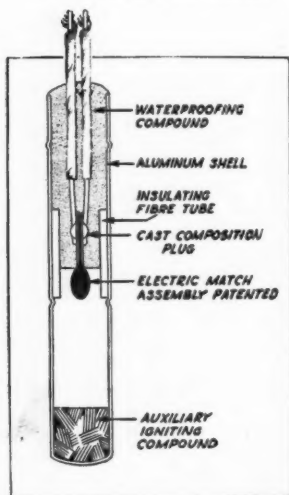


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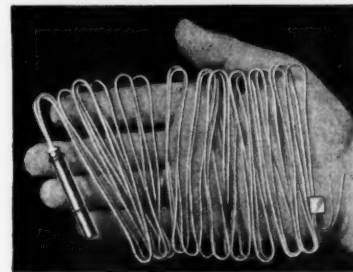
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# The MINING CONGRESS JOURNAL

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*A Journal for the entire mining industry published by The American Mining Congress*

## THE AMERICAN MINING CONGRESS

IT MAY not be amiss to again state the purpose of The American Mining Congress. It has just completed its 36th consecutive annual convention. For the greater part of that time it has carried on its work from Washington, and the list of its achievements in behalf of the industry is astounding. From the creation of the Bureau of Mines, through the campaign to secure recognition of mining as a wasting industry, to the present "new deal" problems, it has endeavored to reflect the best thought of the entire mining industry. It is not a competitive organization. It is organized upon highly cooperative lines. It presents the only common ground for all groups of the mining industry to meet and decide issues that involve the common interest of all. It speaks not for any one unit of mining, but it does present the conclusions of all of the industry in matters that demand joint action. Many vital problems having their inception in one unit of the industry, seriously affect all other groups. The organization offers the industry in 1934 its service as a clearing house for united action upon those problems upon which there can be a general agreement.

## TAXING INDUSTRY FOR EMERGENCY REVENUE

THE mining industry has made its replies to the revenue drive of the Sub-committee of the Committee on Ways and Means in appearance before the Committee on December 20 and now awaits the action of the Committee in drafting the Revenue Bill of 1934. The mining industries believe that some of the recommendations before the Committee on Ways and Means, as they are now proposed, will bear disproportionately and with undue harshness on many and that some of them will have an unfavorable effect on revenues and on business recovery, re-employment of labor, re-establishment of markets and the prosperity of our nation and on these depend the sound and definite sources of government revenues. The Revenue Bill of 1934 should not impede the return of prosperity nor should it tend to dry up those sources upon which the government must depend. The greatest need today is incentive to investment and to development of mineral enterprises in order that men and materials may be employed in the creation of new wealth. The revenue laws as administered have brought ample returns and will do so again.

## A SUPER POWER SYSTEM

THE GROWING alphabet parade, making the most gigantic group of government bureaus, commissions, committees, and authorities, is a cause for grave concern to the mining industry. The trend is so definitely toward government control, government regulation, government-in-partnership-with-industry as to require a restating of those fundamental principles that have marked our forward march during the last hundred years. Muscle Shoals is the first definite step of the government in a business that is already established and a substantial taxpayer. A similar project involving the Missouri Valley, when connected up with such projects as the Boulder Dam, Columbia River and St. Lawrence Waterway, would indicate a future inter-connected power system, government owned and operated, that would completely annihilate private power systems and destroy tremendous aggregate capital, removing it forever as a source of tax revenue. The situation is interesting, if alarming, and should not be viewed with apathy.

## THE HUMAN FACTOR

THE WORK DONE in the improvement of mining and metallurgical technique has given results which have placed American mining men and metallurgists in an enviable position before the eyes of the world. In the difficult times of the present, research work is still being carried on and the rewards will be appreciable if only amounting to a few cents or fractional parts thereof per unit of production.

There is, however, the fact that we are not paying a sufficient measure of attention to the vastly important human factor in our industries. We discuss the amount of work done per hour and the effect of the 8-hour day or the 30-hour week, but what about the loss caused by disaffection of workmen by strikes and the reduction in buying power in the communities affected by the strikes?

The horizon seems to indicate that labor relation of the future will vastly outweigh in importance much of what we have been and will be able to do in technical research and improvement. The difficulties of the past four years have developed, however, in many instances a better relation and a better understanding of the mutual problems of management and labor. In many mining fields companies have carried payrolls out of surplus in order that workmen might have a few days' earnings per month with which to survive. The closer relationship brought about under these conditions of stress should not be lost or destroyed under increased productive activity which is before us. Management must cherish the advances accomplished to the end that irresponsible and self-seeking disturbers of industrial peace may not find a ready field for their activities in which to work harm to management, workmen, and the nation alike.

## MINORITY OR MAJORITY RULE

IN A REPUBLICAN FORM of government, ultimate power is placed with the majority, which, through its voting power, selects its representatives, each with power to do certain things which on the whole create laws and provide machinery for their enforcement. The rights of the minority are protected by dividing the law-making power into two legislative and one executive divisions. The necessity for affirmative action on the part of both legislative houses and the approval by the executive before any affirmative action can be made effective is qualified only by the right of a two-thirds majority of both houses to override the executive veto.

The rights of the minority are protected but the minority is not given at any point any power for affirmative action. That an organized minority shall be able to control elections is hateful to the representative principle of government and if continuously effective would destroy the government.

In the industrial world this theory is approved but not always effectively. Minorities have been able by superior activity to temporarily attain power. Power once secured is seldom relinquished and never without bitter protest. Minority power is always hateful and from the standpoint of government control cannot long continue against the protest of the majority. In an industrial world minority control is equally hateful to our general scheme of government. Under the National Recovery Act special power is given to organized labor not only over its own affairs but over the methods by which industry shall be conducted. Collective bargaining, proper in itself, carries with it not only the right to secure employment but to control the employment of others.

# Still Need for a Protective Tariff

By HON. FRANK E. CROWTHER\*

**U**NDER the present world conditions and the present administration policies outlined for future action, it seems almost an act of heresy even to discuss the policy or pretend to be a protectionist in this country at the present time. However, I am one of the old-fashioned school of protectionists who believes that no rate is too high if it really protects an American industry that pays decent wages and contributes to American prosperity. That is my policy, and it has been ever since I have been a member of the committee.

I have never been finicky about the percentages of rates or whether combined specific and ad valorem made a rather large ad valorem if the necessity existed for their allocation in a tariff bill.

Of course, there are opinions at wide variance with that policy at the present time, and yet it seems to me that with the allocation of the codes under the new system of NRA, there never has been a time when the tariff was as necessary as it is today, and I think that the best demonstration of that is the fact that provision was made in that bill to take care of conditions that might develop under new codes into ruinous competition from foreign producers due to our increased cost, due to new types of hours and new types of wages and consequent rise in price of materials where everybody was involved in the NRA codes, and so that section was put into the bill. It isn't as strong as it ought to be. As a matter of fact, we had a very good section in the House, but when they got through in the Senate and the conference with the provision providing for reporting to the President and to the Administrator, these conditions that were developing foreign competition the word "may" was substituted for "shall," making it permissive rather than mandatory.

\* U. S. Representative for New York.

I understand, further, from one of the leading industries of the country whose representative I had an opportunity to converse with, that the method of procedure is exceedingly difficult at the present time. Section 3-E specifically states that upon notice to the President or the Administrator of the competition that exists, the unfair competition due to present conditions, and particularly as they are connected with the prices that will be developed under the NRA codes, the matter shall be referred to the Tariff Commission, which of course as you know is a fact-finding commission, an administration set up for this especial purpose, that doesn't recommend rates but that makes thorough investigations and then reports them to the President of the United States.

It seems that there has been some sort of a foreign trade bureau set up in the NRA and that these complaints are referred to them first; they don't go to the Tariff Commission, and this gentleman told me that they have concocted a long questionnaire about a yard long that you have to fill out in making your application and it looks as though the degree of delay was going to be intensive. I hope to secure information as to why these complaints have not been immediately referred to the Tariff Commission, as is provided for in that section of the Act.

Of course, this tariff policy has been a subject of discussion for a century or more, and every year somebody tries to invent some new reason or excuse why we should discard the policy of protective tariff. I don't believe that we ever can discard it. We have maintained a condition in the United States even under the depression, as regards the type and standard of living of our people that isn't matched anywhere in the world. Some of you men have traveled, you have been in Germany, you have been in England, you have been in some of these

other countries, and where under all God's universe do men and women who toil and work in the shops and who work in our mills, live as they live in the United States of America? Nowhere that I have ever seen. Outside of a great American manufacturing plant it is not unusual to see four or five thousand automobiles parked in acres of space. A similar factory in England would be lucky if they had a thousand bicycles, perhaps less than that. Our living conditions on the average are far superior to those anywhere else in the world.

The opponents of the tariff policy say, "You have protected infant industries until they are as big as an elephant and you still ask for protection." Frequently when an industry has grown and developed to a fair degree of production and strength in the country it still needs tariff protection as against the low production commodity cost in foreign countries.

I have been a member of the Ways and Means Committee now for 12 years, and I presume it is a fair statement to make that probably half of the people in the United States who are in industrial activities and are interested in the policy of American go-aheadiveness and success probably belong to one party and 50 percent of them belong to the other party.

So it rather grieves me to find a great many of my personal friends at home and in various parts of the country who have been beneficiaries of the policy in their industrial activities that still argue against it. I think they argue against it with their fingers crossed, knowing that it is a policy that is rather likely to stay and that they are to benefit as much as they have done in the past from its application to our industrial life in this country.

In the 1929 Act we had some very strong briefs presented against protection for the mining interests. Particularly they stressed manganese. There has always been an argument about manganese. Our operators in this country have represented that they could, if they were given something like a fair degree of protection, produce 75 percent of the manganese necessary to take care of the United States' needs. It was stressed at that time as a war necessity, which condition we hope will never develop again—we are hoping for peace in the future. But manganese is a necessity in steel production. As a deoxidizer and as a desulphurizer, nothing takes its place. All sorts of arguments were offered against the American producers. Criticism of the low grade of ore in this country and all sorts of reasons and excuses were offered as to why there should be no tariff protection, and I am sorry to say a good many of the briefs and the remonstrances came from American industries that were being protected in the product that they manufactured themselves, the very essence of inconsistency, and while I am a staunch protectionist and always have been I have little sympathy for people who are as selfish as that in their viewpoint. I am of the opinion that the protective tariff is a definite part of our governmental policy in the United States, and that it is going to stay. As yet there hasn't been a rate changed, and I venture to say that it will be many years, gentlemen, before there will be a single rate changed in

the Hawley-Smoot Bill. Such investigations as have been held by the Tariff Commission since that bill became a law indicate the fact that the utmost care was used and that the duties in it are not too high, but in many instances they are entirely too low for the continued progress and success of many American industries.

We had a great depression up until 1929 in the textile industry. You remember that a few years before that our wives and sweethearts and the women of the country adopted the fashion of bobbed hair. That didn't look very serious at the very beginning, but inside of a year after that fashion was adopted there were something like 40 million wool hat bodies that were imported into this country from Italy, at an average cost of about 17 cents apiece, less than the wool could have been procured for in this country, and many of our hat shops went out, three or four hundred thousand girls east of the Mississippi River lost their jobs who used to work in our town and city millinery stores, sewing braid, making shapes, bending wire shapes, making artificial flowers, curling feathers, and making your wife a hat, because in those days every woman used to have a hat made that she thought was becoming to her. She was an individualist so far as hats were concerned. Then came the standard hat made of felt fitting close to the head. After it was blocked and trimmed and a 10 cent store ornament put on it it was \$1.89 on Seventh Street and \$9 on Connecticut Avenue in the shoppes where they sell it with two "p's." That put the hat business out. It took them a year or two before they could find themselves and get themselves adjusted to the new conditions.

The textile industry suffered. About that same time the fair ladies of this country decided they were going to cut off about 13 inches up above and 13½ or 14 inches down below from their dresses. You remember it. It took two yards and a half to make a skirt that you could get on the trolley car without selling tickets for the exhibition. That was two yards and a half, 27 inches wide, of material that wasn't needed on an individual dress. Suppose out of the population of the country there were 40,000,000 women. That was 100,000,000 yards of one kind of textile that was no longer necessary. If you multiply that by silk and satin and serge and calico and print and crepe de chine and all the various articles that are used, say you multiply it by five, including fur and waterproofings, that was 500,000,000 yards of those various textile commodities that were no longer necessary in the production of female attire.

So you see Dame Fashion played a part in slowing up the textile industry at that time.

Another thing that may interest you is that no matter how careful we are in writing a tariff measure, the fact remains that in its administration we are presented time after time and day after day with apparently insurmountable difficulties in the administration. We have a very smart set of men in the legal profession in New York who define themselves as customs attorneys, and they say to Mr. Brown and Mr. Smith, "I see you import; you are paying \$500,000 a year at the customs house. We think we can

get you a lower rate, a little better classification over here in Section C of the Metals Schedule and save you \$50,000 a year."

The number of those cases that are successful is tremendous as they come to my desk from the courts. We don't win them all. I don't know that we win half of them. The fact remains that every one that we lose robs us of revenue and makes the percentage of rates in our bill that much lower. Every one that we win doesn't do us any particular good because then we are getting only what we intended to get when we wrote the law.

In order to try to avoid that in the committee of which I had special charge, the Sundries Committee, involving \$90,000,000 worth of imports into the country, we had the experts and the attorneys in New York who defend the Government side of the case in court, and we went over all the individual cases as they were connected with the paragraphs of the tariff law in that section, endeavor-



HON. FRANK E. CROWTHER

ing to find out what the argument was and what failed in the interpretation of the court as regards the intention of Congress. That was always what it hinged on, what the intention of Congress was in this language. Although we tried to cure all the language in all those paragraphs, and although every other committee worked just as hard, sometimes until the small hours of the morning, with the judge of the court and his assistants, and the various memoranda from those proceedings and tried to cure that in language in the Act, the very next year there were over 60,000 appeals in New York to the court of appraisers, from importers largely, some from domestic manufacturers because they are both involved, in spite of all that care that was taken to remove any question of doubt as to the intent of Congress. So you can see what a difficult procedure is involved in administration after you get the law on the statute books.

There is one specific instance that I want to cite to you that came to our attention. It couldn't happen again because it happened right after the war and because of some war results in foreign countries. There was a shipment made to this country of one million seven hundred sixty-odd thousand, about one and three-quarters million, five-pound blankets from France. They were part of the unit that had been supplied by the British Government to the French Government as their contribution toward war supplies. They were in France and a large concern in the United States formed a subsidiary corporation, one of these things that clever lawyers get up for them, and put in an office boy and a stenographer and somebody else and gave themselves a name, and they went over and bought these blankets, and they bought them for six francs, but the franc, Mr. Chairman, was only 5 cents then. It was before the franc had been stabilized at the present 4.9. The duty on them written into the tariff law was 18 cents a pound and 30 per cent ad valorem on blankets of that description, the 18 cents a pound being the compensatory duty because of the duty on yarn and on wool, and the ad valorem duty being the degree of protection that was considered necessary as against the foreign commodity price. In combination duties when they are in the tariff bill, the specific represents the compensatory duty because of materials or commodities and raw materials ahead up to that time, and the ad valorem represents the rate of protection. That made the duty five times 18 cents or 90 cents and 30 per cent on 30 cents was 9 cents, and the duty was 99 cents a blanket. One of these smart customs attorneys who was in my office afterwards and who told me about it long after it had happened, said he told them he thought they could get it over here under 1430 and save themselves a good deal of money. He finally concluded that under 1430 which provided for goods embroidered, if they would have an initial or a star woven into the corner with woolen yarn, he could get them in under title of embroidered articles. They put in a little star and a little rough initial in the corner with a chain stitch. It cost them a cent apiece to do that. They brought them in as embroidered articles. The Treasury Department was satisfied and didn't make a case against them and they were never taken into court because the Treasury Department held that they were within their rights and could bring them in under that language. The duty in that paragraph was 75 per cent ad valorem, a very sufficient duty, you will admit, on a dollar basis of commodities coming in here, but with the franc depreciated to 5 cents there was a fine chance to apply the 75 per cent duty because it was only 22.5 cents as against 99 cents if they were brought in as blankets.

They brought the blankets in here, and the Government lost in duty one million two hundred thirty-odd thousand dollars. That concern sold those blankets that cost them 30 cents plus 22.5 cents duty, 52.5 cents—say they cost a nickel a blanket to bring them here, which is pretty high, up to 60 cents for transportation and everything included, all together—for \$3.25 single blankets and \$3 apiece in bales of a dozen, so you can just get an idea of what that transaction netted that American concern with

(Concluded on page 28)





*Clay Bank After Overburden Has Been Removed*

# The National Clay Mining Industry<sup>†</sup>

By GEORGE C. CROSSLEY\*

THE average man of the street has little knowledge of the clay mining industry, which I am here to represent. Yet it is one of the most important of the mining industries of the country. Clay is unlike iron, copper, zinc, gold and other minerals taken from mother earth in that iron is IRON, copper is COPPER, zinc is ZINC, and so on, but there are over 700 known kinds of clay, and over 200 of them are commercially useful and constitute an important ingredient in many manufactured products widely used in our homes, industries, and elsewhere.

Clays are classed into two distinct divisions. High grade and low grade clays. Only the high grade clays will be covered by this talk, as the low grade clays are not mined, processed and marketed, as the raw material for sale to manufacturers of the finished product, usually manufacturers of these products mine their own clays for use adjacent to the mine.

The clays of which I will speak and which are generally known in the trade as china clays, kaolins, ball clays, refractory clays, Fuller's earth, bentonite, ochres, etc., are used in the manufacture of chinaware, porcelain, glass, grinding

wheels, rubber products, floor coverings, roofing, electrical insulators, wall and floor tile, bathroom specialties, chemical stoneware, enameled iron ware, paper coating and filling, paints, architectural terra cotta, asbestos products, plaster products, building boards, white cements, crayons, chemicals, pencil leads, artificial leather, adhesives, retorts, furnace linings, crucibles, decolorizing oils, phonograph records, soap, etc.

There are over 500 operating clay mines in America producing a greatly diversified list of clays for as many different purposes, and there is at least one clay mining operation in every State of the Union with a large number in others.

In most cases these operations are in isolated sections, many miles from the nearest town, and in time of reduced activity in production, the matter of unemployment is a serious one, and there are many mine operators who have been carrying their employees on their pay rolls for months at a time when their services were not needed, and in some cases employers are providing food and supplies through their commissaries to miners and their families, as well as providing cottages, doctor's services, recreation, etc., entirely at no cost to these employees and their families, in the

hope that just ahead there will be need for their services and better times will come, but whether improvement is soon or late, the employer has no choice but to take care of his faithful men, and their families as long as he is able.

Due to the lack of cooperation in the industry, the marketing of all kinds of clays has been on a highly competitive basis, and in most cases, prices are fixed by the buyers and consumers by unfairly using one producer against another in the process of beating the prices down to a point where it is impossible for the mine owner and operator to pay decent living wages, and to set up reserves against unforeseen contingencies, or to make a fair profit on the investment.

In most cases, the operators have been working on such a small margin as a result of extremely low prices that it has been impossible for them to provide sanitary housing facilities, safe working conditions, accident insurance, replacement of wornout and dangerous machinery, as well as many other needed reserves against conditions that are bound to come, and cause distress, unemployment, accidents, etc.

There are many unfair and unsound practices throughout the clay mining industry, which could easily be corrected and improved if a code of fair competition could be established and properly made effective. All this could be brought about at little cost to anyone, and to the great advantage of both the producer and consumer, provided the industry could be properly organized, and cooperative action be had on the many matters which have caused unfair competition and destructive practices.

There have been several attempts to organize the clay mining industry in past years, but because of the fact that there are so many small producers scattered all over the country, also that there has always been present the constant fear of violating the antitrust laws, these attempts have not met with much success.

About five years ago another effort to bring about a national organization of clay mining companies was made with fairly satisfactory results, and the American Clay Association was formed. Many meetings were held, and a great deal of good accomplished, and a code of fair competition was developed and filed with the Administration, but the movement was far from successful, and of sufficient influence to accomplish what it should.

With the introduction of Government cooperation under NRA, it was felt by many in the industry that a solution to our problems was close at hand, and a general call for a meeting was sent out, and a fine start was made as a result of this meeting. Within a short time one group after another pulled away to organize its own separate association and code of fair competition, until the industry is now broken up into many small groups, each with its own plan and ideas of how a code should be developed. This has resulted in making it impossible for those remaining in the national association to cooperate fully with the Administration and the industry as a whole in a way to correct unfair competitive practices, and bring about the benefits to the industry, its employees, and the public, which could be accomplished by a strong national organization.

(Concluded on page 32)

\* President American Clay Association.

† Presented to the annual meeting of The American Mining Congress.





*Concentrating Mill, Morenci Branch, Phelps Dodge Corporation, at Morenci, Arizona*

# Copper Industry of Arizona Present and Future

By ROSS D. LEISK\*



*Ransome, U. S. Geological Survey  
Plant of the Miami Copper Company*

THE VIEWS expressed in this paper are based upon opinions arrived at by certain members in the copper industry in Arizona. They are the result of experience and observation.

These opinions may not be completely shared by all members of the industry. That is fully realized and appreciated.

For many years Arizona has been the leading copper producing state of the United States, its career as a copper state started with the opening of the high-grade, direct smelting, replacement type ore bodies. Later came the opening of several large mines on ores of an entirely different character. These were very large low-grade disseminated deposits, commonly called the porphyries. The Arizona porphyries were for the most part underground mines as distinguished from open pit operations. To bring them into production, large capital expenditures were required and difficult physical and metallurgical obstacles had to be overcome. These mines were remarkably successful. They operated for many years and, favored by a copper price ranging around 14 cents per pound, paid for themselves many times over. Their continued operation as the grade of the ore declined, in one instance to well below one per cent of copper, was an outstanding achievement in the annals of mining and metallurgy.

During this period of general prosperity in the Arizona copper industry, an unfortunate situation began to develop. This was unscientific and unrestrained state taxation of mining property. The industry came to be looked upon as an unfailing source of revenue—and extravagance in state government grew rapidly.

All will agree that a producing mine should pay in taxes the proportion of necessary governmental expense that it is responsible for. Perhaps it should also pay something in addition on the theory that it is consuming a natural resource, but if it does the additional amount so paid in the form of taxes should not be

\*Assistant General Manager, United Verde Extension Mining Company.

spent but should be impounded and the interest on it used to reduce future tax rates.

Had some such procedure been followed in Arizona, its finances would now be in better shape, its people happier, and the future of its mining industry would be more secure.

The valuations on individual mining properties were not based on appraisals and it would be too charitable to say they were mere guesses. Rather they were figures which would without disturbing the tax rate produce the desired amount of revenue. At one time a property employing about 600 men was paying state taxes at the rate of about \$1,000 a day. There was no appeal from an assessed valuation by the State Tax Commission except the formality of a hearing before what was called the State Board of Equalization. The State Tax Commission then sat as the State Board of Equalization.

The mining industry of the state must shoulder much of the responsibility for this situation. Whether there was reluctance to bring valuation data into the open where it might be compared with market quotations, whether there was hope of individual relief through political influence, or whether the reasons are elsewhere, the fact remains that much of the industry for a long time seemed curiously indifferent to the increasing burden being placed upon it.

It was not until 1930 that under a revision of the Arizona statutes it became possible for one of the smaller companies, by paying its taxes in full under protest, to bring suit for relief. This suit was easily won by the mining company, and a large refund was ordered. Encouraged by this example, many other mining units brought successful suits. The procedure, however, is fundamentally unsatisfactory. The state spends the taxes paid under protest, and when refunds are ordered by the court the money must be raised by new taxation.

There has as yet been no real tax reform in Arizona and the state as a whole is still unwilling to face the fact that the well of tax revenue from the copper industry is going dry.

Two other things have happened, both of great importance. The first was the creation of a large surplus of copper in the United States. The existence of a surplus of copper is proof that a mistake has been made, it is the result of a human error. Copper is not a crop dependent on the weather. The surplus came about as the result of an attempt to establish and maintain a selling price for copper at nearly double the average cost of production. It seemed that a simple way had suddenly been found to make the copper industry highly prosperous.

If the producers would refuse to sell below the established price, the consumer would have to pay the price, the producers would make a great deal of money, copper shares would go up and might become more attractive than bonds.

What actually happened was this: The consumer did have to pay the price for a little while. Then he went on a buying strike and it was astonishing how little he could get along with. Attracted by the high price, scrap copper began to appear from many sources and in large quantity. Shipments of ore from small high cost mines long idle began to pour into the custom smelters. Soon it became necessary to buy copper that would otherwise have been offered below the established price. Japanese ingots piled up in one of our refinery yards. The high price of copper opened wide the door to copper substitutes: aluminum wire for transmission lines, stainless steels as a finish for great office buildings instead of brass and bronze. Nevertheless, the copper mines of North and South America continued to produce at high capacity, turning out copper that was not being sold and setting up paper operating profits on the monthly balance sheets.

More serious than all this, perhaps, was that the apparent prosperity of the industry resulted in additions to existing plant capacity and made easy the financing of many new and highly competitive units in Canada and Africa. American capital had a large part in this financing and new mines were brought into production more rapidly and on a larger scale than if the industry had been producing one pound of copper, and no more, for each pound sold.

Finally the price broke and continued on down to a record low. The damage had already been done, a large surplus had been created and much new productive capacity had been added to the world. A cry for help arose and a temporary duty of 4 cents per pound was procured which was effective in halting the importation of foreign copper. As yet it has not produced the three or four cent differential between domestic and export prices that many had hoped for.

The second important thing that has happened is that the world's annual requirements for copper can now be produced at a lower cost than a couple of years ago. There have been opened in Northern Rhodesia vast deposits of disseminated copper ore which are three to four times richer than the Arizona porphyry deposits. The metallurgy of this African ore is in most cases unusually favorable and the deposits possess other advantages. Two large Rhodesian mines have come into production and their ability to make very low cost copper has been fully demonstrated.

The world price of copper must for many years be strongly influenced by Rhodesian costs. The copper business is not a monopoly, either corporate or governmental, and there must be a reasonable relation between price and the average cost of production. It is obvious that some of the high cost mines are no longer competitive in the industry.

Scrap copper is an important factor. We know little about the habits of scrap or how long it takes the average pound to make the round trip, but we do know that it is a source of cheap copper. It is interesting to speculate on whether circulating scrap will some day supply a much larger percentage of our consumption than at present.

There seems to be a general impression that American copper can no longer be sold on the foreign market. This is a mistaken idea. I wish to cite the case of the United Verde Extension Mining Company. This company is not the lowest cost producer in Arizona. Its ores have been high grade but they have been expensive to smelt and an expensive mining method has been necessary.

In 1931, with the domestic market stagnant, a decision on policy became necessary. Should operations be suspended indefinitely or not, and if not, what should be done with the copper? It was decided to operate and store the unrefined copper at the smelter pending the finding of an outlet. This outlet was found in Europe. The net result today is that the United Verde Extension Mining Company has been able to continue operations and has kept its people employed and has sold all of its copper. This was made possible by the fact that it had made friendly contacts in Europe.

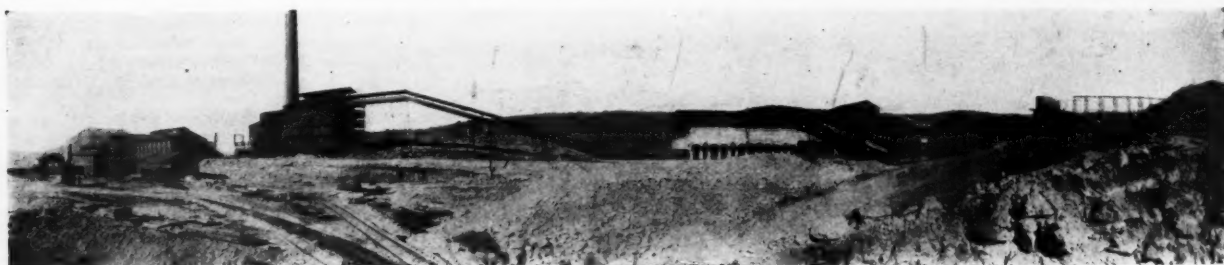
The foreign market exists and is growing. Copper is being mined to supply it and some foreign mines are increasing production. The American producer can share in it if he will compete.

The 1932 consumption in the United States is reported at 336,000 short tons, and for the rest of the world 741,000 short tons.

I have outlined the background of the situation which confronts the copper industry of Arizona. Arizona's annual copper production in normal years was about 360,000 tons, with ten or eleven important units operating. In 1932 the production was about 85,000 tons. At the present time three mines are producing and a fourth unit, feeling secure in its competitive place in the industry, has adopted the commendable policy of making large capital expenditures in preparation for future production and thereby has kept some 500 men on part time employment.

Looking to the future, the surplus which looms so large will disappear in time. If the industry will look to its

(Concluded on page 21)



Smelter of the Magma Copper Co.

# Recent Developments Concerning International Double Taxation

By JAMES N. KNAPP\*

THE primary problem of international double taxation is the determination of what income or property and how much of that income or property of a foreign person or enterprise shall be taxable by a country because it is rightfully deemed within the jurisdiction of the country within those borders the property exists or the business or activities are carried on. The problem chiefly affects countries other than the country of domicile. Each country has the right to and will tax its own citizens as it sees fit on part or all of their income, no matter where earned or received. For instance, in the case of an American corporation operating also in England and France the important problem of international double taxation arises so far as treaties are concerned only with regard to the respective taxes of England and France. The American taxes on that corporation are fixed by the American Government and are not properly affected by any treaty with England or France.

The most practical problem for the business man is that each nation now has its own laws and policies and methods for ascertaining how much of the income of a foreigner is properly taxable by it. As a consequence, the business man who operates also in foreign countries finds that these laws and rules are not uniform. He finds that different methods and theories are applied to his income, and that these are conflicting and the result is that he is in effect taxed on the same income by two or more countries. As for instance: An American company with its factory in the United States, may pay an income tax to Spain on 50 per cent of its total net income because its goods are sold in Spain to Spaniards, for the reason that the Spanish Government may determine that 50 per cent represents the relative importance of sales to manufacture in producing the income of that particular concern. Then, it may pay a tax on another 50 per cent of its income in France, because its principal selling office is in France and that fact is considered of prime importance under French laws; and on a third 50 per cent of its income in England, Switzerland, or Germany because it may have a large inventory of warehoused goods in those countries, and finally, it may pay on a

fourth 50 per cent in Chile, where its mine is located; and of this in addition to its taxability in the United States.

Double taxation may and does arise in various forms of taxes. As to income taxes it arises in various kinds of income. Because of the time at my disposal I shall confine myself exclusively to the problem of true business income derived by an enterprise carrying on portions of its activities in foreign countries.

The history of the movement to remedy this recognized evil and obstruction to international trade and commerce by means of international agreement dates from about 1920. The movement largely centers around two men. The late Dr. Thomas S. Adams and Mr. Mitchell B. Carroll. Dr. Adams initiated this movement and was, until his death, recognized leader and father of it, and as such was respected and followed internationally as well as in the United States. No words of mine could do justice to the value of his contribution to this cause of international comity.

During the last 12 years much progress has been made. First, the International Chamber of Commerce introduced the subject by the passage of resolutions and the exertion of its influence. As a result of this, the League of Nations appointed its Fiscal Committee primarily for the purpose of developing this subject. This committee has been at work for a long time. Dr. Adams was its most important member. There has been accomplished, first, a general interest in the subject, then a study of its specific problems, then announcements of principles by the International Chamber and the Fiscal Committee, and finally the drafting of proposed treaties on various phases of the problem. There are already in existence some twenty or more bi-lateral treaties actually signed and in force on this subject at the present time.

In 1931, Mr. Mitchell B. Carroll was selected to make and prepare for the Fiscal Committee a detailed study of the tax laws and practices of some 35 nations. This related chiefly to the methods for the allocation of business income between countries, and a collation and summary thereof with a view to evolving a principle or set of principles upon which international agreement could be reached. The object was a Plurilateral or Multilateral Convention to be entered

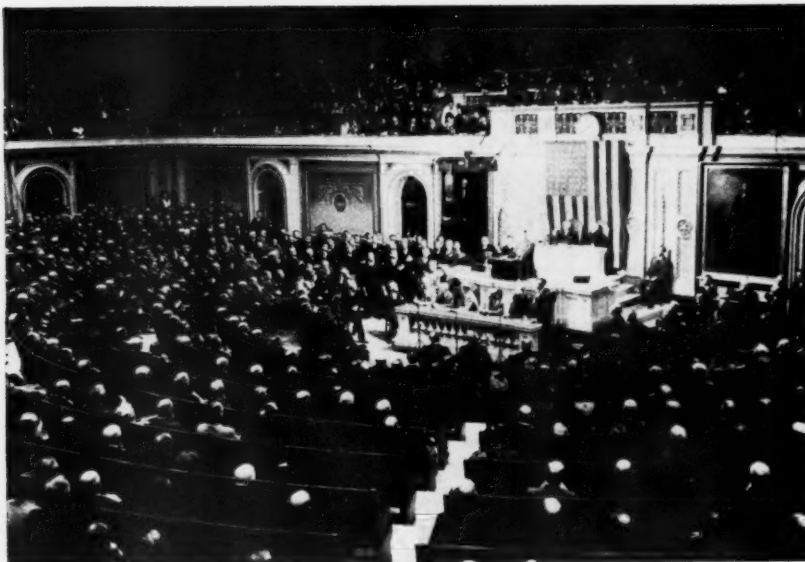
into by as large a number of countries as possible and thus to settle for good, and make uniform the general rules governing the methods for such allocation, and to put it out of the power of legislatures or government officials to claim more than their proper share of income as taxable by them. Mr. Carroll spent over a year traveling all over the civilized world on this mission, and presented his report to the Fiscal Committee in the early part of this year.

In March of this year, a subcommittee of the Fiscal Committee visited the United States for the purpose of acquainting itself intimately with the views of American business on this subject. This subcommittee listened to a number of us here with open-minded attention. It returned to report to the Fiscal Committee in Geneva. Then, in May, the American Section of the International Chamber of Commerce, by its Double Taxation Committee, prepared and adopted a set of definite recommendations for adoption by the International Chamber of Commerce at its biennial Congress of the International Chamber in Vienna in May. Mr. Henry B. Fernald, well known to you all, and I attended the Congress at Vienna as representatives of the American Section. Mr. Fernald has done a great deal of work and contributed very considerably to the present result, and is so credited officially in the report of the Fiscal Committee. The International Chamber adopted the resolutions drafted by the American Section practically verbatim. Next, Mr. Fernald, Mr. E. C. Alvord, who has also been active for years in this effort, as you no doubt know, and I were invited by the Fiscal Committee to appear before it at Geneva in June. We spent about a week in Geneva and made extended oral and written arguments on certain aspects of the matter.

On June 26, 1933, the Fiscal Committee promulgated a report and a proposed convention in form adopted to its signature by many or all nations. It is entitled "Proposed Convention for the Allocation of Business Income Between States for the Purposes of Taxation." This report has been transmitted by the League of Nations to the various governments with a recommendation for favorable action. The Fiscal Committee is composed of men of official character at the head of the taxing administra-

\*Union Carbide and Carbon Corporation.





*President Addresses Seventy-third Congress*

tions of the principal countries. For instance, Dr. Herbert Dorn, who headed the subcommittee on its visit to the United States, was the principal justice of the highest tax court in Germany. There has been no American member since the death of Dr. Adams. All of the members of the Fiscal Committee, with possibly one exception, are, I believe, in hearty accord with the report. The report should, therefore, have great weight with the respective governments, and it justifies considerable hope for successful adoption by the principal countries. It has the hearty endorsement of the American Section of the International Chamber of Commerce and also of the United States Chamber of Commerce. Further than this, in the opinion of the members of the Double Taxation Committee of the American Section, it coincides with our ideas of what such a treaty should be to a degree beyond our most optimistic expectations.

Before I give you the specific substance of this Proposed Convention or Treaty, I must make a brief sketch of the practices and methods of allocation of such business income which are in existence today among the nations. All of these had to be reckoned with in arriving at a common ground. I shall follow the classification of these methods, set forth in the report, because in my opinion it is the clearest classification. The first and most important method to be mentioned is the so-called "separate accounting method." This briefly, is that concerns shall keep proper books of account showing items of income and expenditures with proper description and distribution, and present a true accounting picture separately of the activities carried on in the jurisdiction where the branch establishment exists. This method is recognized in all countries but never as the sole factor or method, and the weight given to it varies in the different countries.

The second method is the so-called "Empirical Method." This method is to compare the branch establishment with other local enterprises of the same character in the country where the branch

exists; and with the aid of that comparison fix the net taxable income in that country at the amount it would have made if it were an independent enterprise of the same character. This method is found prominent in the law and practice of England and Italy, for instance, and to some extent in United States law. In England they do it by taking a percentage of the turnover or total sales of the branch establishment as the net profit and they have elaborate statistics for that purpose, showing average percentages of profits to sales of other local companies.

An allied or subordinate example of this method is the correction of individual items or prices, by substituting figures derived from other similar concerns, as a step in making necessary corrections to the book of account of the branch.

The third method is the so-called "Fractional Method." This appears in two firms. In Spain, for instance, the tax authorities require a showing of the entire income pertaining to the business of which the branch establishment forms a part and then a committee of experts estimates what in its opinion is the relative importance of the local activity in earning the income and thus fixes a fraction of that income as taxable in Spain. This is, of course, a fairly arbitrary method. A similar though sounder method is followed in some Germanic countries, as for instance the treaty between Austria and Germany provides that in the case of manufacture in one country and sale in another, the manufacturing establishment earns two-thirds of the income and the selling branch one-third. In other countries, notably in Switzerland and in States of the United States, like Massachusetts and New York, the fraction is arrived at by a comparison of property owned, sales made, pay rolls, costs or other indices of activity within and without the state, and that fraction applied to the total net income.

One of these general methods or a combination of some or all of them

exists in all civilized countries and all of these theories had to be at least partially reconciled if an agreement was to be reached. The proposed convention deals with them in the following manner.

It deals only with ordinary business income, and excludes income from investments, rents, royalties, and other kinds of income when not part of a business. It deals only with the allocation of income, leaving each country to make and apply its own tax rates to that portion of net income properly allocated to it.

It provides that no income is to be attributable to a state as taxable therein unless there exists in that state a permanent establishment. This term is defined and roughly speaking it distinguishes between a factory, office, or resident agent on the one hand as a permanent establishment, and an independent broker, merchant, or contractor, or a traveling salesman on the other.

The convention provides that a subsidiary company is not a permanent establishment of the parent enterprise, and must be taxed on its own footing, subject only to the right to restore income which has been diverted on its books from what it would have been if the subsidiary had been an independent enterprise.

The controlling principle of the convention is that to a branch establishment there shall be attributed the same income it would have received if it were an independent enterprise engaged in the same or similar activities under the same or similar conditions. The methods for arriving at this result are definitely set out. First, such income will, if possible, be determined on the basis of separate accounts pertaining to the branch establishment. If the books show such an income that is an end of the matter. Next, if they do not, they must be corrected if possible to show such an income. If this is impossible or if no adequate and normal accounts are produced, or if the taxpayer agrees, then and then only can some other method be adopted. The first method which must then be adopted is the method of applying a percentage of turnover derived from a comparison with similar enterprises operating in that country.

Down to this point the enterprise does not have to produce any information nor need the tax authorities seek any information beyond that which exists in the local jurisdiction. There is no occasion for going into the entire profit or losses of the whole enterprise of the home office or in other countries.

When neither of the two methods can be used then there may be a determination by the fractional method, by applying to the total income of the enterprise everywhere coefficients or fractions based upon gross receipts, assets, number of hours worked or other appropriate factors.

The order of this is the important and beneficial feature. First, the local books. If they fairly represent an income which an independent would have made they must be accepted. If not, next, they must be corrected if possible by changing items or prices. Next, and only if that cannot be done, can the authorities resort to the percentage of turnover by comparison with other concerns. And finally when and only when

*(Concluded on page 30)*





# WHEELS OF GOVERNMENT



**N**ATIONALLY all eyes are focused upon the nation's capital, particularly upon the Congress, which is taking ranking position. Not even the voice of the administration or the activities of the NRA detracts. Much was predicted for this session and even more is expected of it. How its activities are viewed depends entirely upon what is desired from it. Some have "feared the worst"; some have "hoped for the best"; while others have sat complacently by confident in the belief that the President would "handle the situation."

Evidence that would seem to justify the latter group was the vote on the Wheeler amendment to remonetize silver, which was defeated by the amazing margin of only two votes. Observers are of the opinion that the administration's victory in this respect will be short-lived and that it will be difficult to defeat the amendment when it is brought up after April 1 when the various nations have ratified the silver agreements. The vote in the Senate was 45 to 43, and the House is definitely overwhelmingly in favor of remonetization. The President, however, may use the authority he believes he has under existing law and "do something" for silver. He is in favor of "controlled currency" and prefers discretionary rather than mandatory powers.

During the early days of the present session much was heard about amendments to the Securities Act, the regulation of the Stock Exchange, and the nationalization of the railroads. It is now evident that there will be no immediate action on these questions, and there is a possibility that nothing will be done about them at this session. This is particularly true as regards the railways. Commissioner Eastman's report has nullified immediate action.

The most important legislation now before Congress is the Revenue Bill. The Ways and Means Committee of the House is scheduled to report the "Revenue Bill of 1934" at a very early date. Much interest is attached to this report because of the preliminary report of the special subcommittee on the "Prevention of Tax Avoidance" and the statement of the Treasury in relation to such matters as depletion and depreciation.

Lengthy hearings have been held and industry has had an opportunity to voice its objections. In arriving at its recommendations the committee has made a number of compromises between the position taken in its subcommittee report and the statement and position of the

Treasury Department. It now appears that consolidated returns are to be continued, but with the penalty increased from three-quarters of one percent, as in the present Act, to 2 percent. This burdensome action, if it becomes a law, will result in unending administrative difficulties in the work of the Treasury Department. The penalty is prohibitive to the majority of industrial activities and must inevitably result in organizational changes both costly and difficult to the government and the taxpayer.

The subcommittee recommendation for an arbitrary 25 percent reduction in depreciation and depletion deductions for the three years 1934, 1935 and 1936 met with flat opposition on the part of the Treasury Department. In addition to the question of the constitutionality of such a measure, the Treasury clearly stated that: "Deductions for depreciation and depletion are fundamentally the same in character as deductions for the cost of goods sold in the case of a merchant. Consequently, the Treasury doubts the wisdom of the proposal to limit such deductions to 75 percent of the amount actually sustained, not only because of its doubtful constitutionality, but because of its inherent unfairness. A taxpayer who did not provide for a depreciation of assets used in his business could not long remain in business and the income tax should be levied on the assumption that he will provide for such depreciation."

The mining industries will await with pointed interest the treatment in the Bill of Dividends Out of Pre-March 1, 1913 Earnings; Foreign Tax Credits; Sale of Mines or Oil and Gas Wells; and Capital Gains and Losses.

The 30-hour week bills are still in the legislative picture as witness the introduction of H.R. 7202—Connery (Massachusetts) to provide a 30-hour week for industry, referred to Committee on Labor; H.R. 6561—Celler (New York) to establish a 30-hour work week in all branches of the United States Government service, referred to the Committee on Civil Service; H.R. 7430—Crosser (Ohio) to establish a 6-hour day for employees of carriers engaged in interstate and foreign commerce and for other purposes, referred to the Committee on Interstate and Foreign Commerce. It also must be remembered that the Black Bill—S. 158, which was passed by the Senate at the first session of the present Congress and made the subject of hearings in the Labor Committee of the House, is on the House calendar. The attitude of the American Federation of Labor and of the Department of Labor of the United States government with reference to the 6-hour day is clearly before the country and, although the National Recovery Administration in its work with the managements of industries has set forth in the various codes the working hours per week which will do the least violence toward industrial recovery, there remains always the possibility of action on the bills indicated above.

It should be remembered that Secretary of Labor Perkins has advocated steadily the adoption of the 30-hour week and has included it as a major tenet of her 10-point program for labor under her administration. The labor organizations generally have adopted an active program in favor of this legislation, William Green, president of the American Federation of Labor, recently in-

cluding it as "Item No. 2" in his organization's legislative program. Observers in Washington insist that there is ample reason to believe that the NRA will insist upon a 32-hour week in all codes that are to come before it shortly for revision.

*Congressional Intelligence*, one of the dependable Washington observers and "trenders," recently said:

"Probably the most persistently annoying problem in the industrial recovery program, and one which requires the greatest delicacy and ingenuity in its handling, is the conflict between the so-called 'independent' and the large producer. In the petroleum industry this problem is paramount. The whole issue of price-fixing is knitted into it. Senators Borah and Reynolds have joined in espousing the independents' opposition to the pool and marketing agreements on the grounds that competition in the industry would be ended, with the major companies enjoying a monopoly, and the public interest at stake. The fight will certainly be taken to Congress.

"The same problem besets the copper industry, delaying agreement on an NRA code for more than four months. It held up the formulation of the anthracite code. It has manifested itself in the difficulties impeding stabilization of the lumber industry. And it is now rapidly coming to a focus in transportation coordination.

The issue is so complicated and so wrought with social significance that it is impossible at this time to forecast a solution or even show any specific trend in policy. The Administration, frankly, is in a dilemma. It is desirous of bringing about industrial accord as rapidly as possible but it realizes that any arrangements giving one group an advantage over another will work to the detriment of the consumer and jeopardize the very economic benefits intended, to say nothing of public indignation. Progressive members of Congress will stir the country to the side of the independents. The Administration will be socially minded but aware of the stern realities of the situation. It would seem that definite determination must await more definite public opinion.

"Only two major natural resources remain to be codified—copper and anthracite coal. With copper, the negotiations continue 'near final agreement.' The age-old problem of small vs. large producers (custom smelters vs. primary producers) is involved. The question of restriction of output, disposal of custom smelter production and determination of minimum price are still to be settled. The price question is especially difficult with copper in view of the disparity of production costs. A low minimum would wipe out the high cost producers. A high minimum would give the low cost producers big inventory advantages.

"The difficulties involving the anthracite code are of a far different character, involving the demands of A. F. of L. and insurgent miners' unions. Both groups want a 30-hour week, which would be more than sufficient as far as production is concerned but hardly possible if it is to mean correspondingly higher labor costs. The industry simply can't afford it and if it tried to the loss of business to competitive fuels would probably put the miner in a worse position than he is now. It is probable

that employment will be spread and wages slightly improved.

"Beneath the cross-currents preventing harmony in industries already codified and some which are still struggling to reach agreement on codes, there is a distinctly better outlook for natural resources. The removal of uncertainty from future monetary policies is in part responsible but perhaps an even more influential factor is the basic improvement in business as shown by the upward trend of steel mill operations. Certainly, the developments in Washington these days are of a stimulating nature and, from the viewpoint of one in a position to observe at first hand, they will continue to be so for some time. With the worst of the money problems out of the way, the apprehension over the budget largely dissipated, and measures being taken to loosen credit, the Administration can now turn to the more tangible business of increasing industrial volume."

Washington's mad pursuit continues. Trains daily disgorge huge numbers of human beings who fill the streets with unprecedented activity. Hotels are overflowing. The headquarters of the NRA are daily besieged. The Halls of Congress echo and re-echo with the footsteps of the great, the near-great, and "the public." U. S. A. en masse has descended upon Washington. The very air is vociferous with the laments, the entreaties, the protests, the oratory of a bewildered populace. Meanwhile, the administration is sunk deep in its problems of meeting the demands of its constituents. NRA is facing revision of many major codes; the President has ordered an investigation into alleged graft and political corruption in the Civil Works Authority; Mr. Lewis, Director of the Budget, will seek five hundred million dollars for general relief purposes; the investigation of the air mail contracts is being continued; labor is demanding such little things as the establishment of a national unemployment insurance system; old age pensions; and industry, according to its various strata, is trying to get its house in order or looking for some loop-hole that will give it an out. Washington in the year 1934 is bewildering. . . . the meeting place for every section of our industrial life . . . the National Cross-Roads.

The following is a summary of bills introduced during the month:

#### Currency:

To establish the Federal monetary authority, and to control the currency of the United States. H. R. 7216—Steagall; referred to Committee on Banking and Currency.

To regulate the value of money in accordance with Article I of the Constitution of the United States, to reestablish the gold standard, to provide for its maintenance and stabilization, and for other purposes. H. R. 7218—Goldsbrough; referred to the Committee on Banking and Currency.

To protect banking and commerce against short sales of securities issued by corporations engaged therein. S. 2370—Capper; referred to Committee on Banking and Currency.

To provide for the calling in of gold now held by Federal Reserve Banks. S. 2310—Mr. Connally; referred to Committee on Banking and Currency.

To provide a bimetallic system of currency. S. 2063—H. R. 6154, 6178, 6191.

(Concluded on page 50)

# Power Distribution for Anthracite Coal Mines

By C. H. MATHEWS\*



*Pennsylvania Colliery Substation*

**A** RELIABLE and flexible power distribution system is necessary at any anthracite coal mine for economical mining, transportation, and preparation of coal. As mine workings advance, transportation facilities must be extended, and as greater areas are opened, more water is encountered. Electric power requirements continue to increase rather than decrease, even though production may be somewhat curtailed as the workings become mined out. The abandonment of one mining area usually compels increased efforts at other places, so the use of electric power continues with the age of the property.

Electric power is usually distributed at high voltage to distant operations, where a lower voltage is needed to operate commercial voltage machines. This necessitates the installation of transformers near the load centers for economical distribution of power. At or near the transformer station suitable switch gear segregates the load for mine fans, coal preparation, and outside and inside equipment. The substation switchboard must be arranged for future extensions, and the transformers must be so located that additional banks can be installed without undue expense.

Adjacent to the substation building and properly located for connections to the outgoing transmission lines a distribution structure should be installed. This structure will permit connections of any feeder panel circuit breaker to any distribution line which is very convenient when rearranging circuits to meet changing conditions.

Distribution of 2,300 volts is economical, reliable, and safe and permits transmission distance impossible at lower voltages. Adequate grounds must be provided on the protecting armor or power cables; also the frames of motors and control must be grounded.

Direct current trolley and feeder lines must have sectionalizing switches at all taps off the main power lines, and track bonds require close attention to eliminate

excessive power loss and motor failures. Tracks are grounded through negative feeder lines from the surface, but no ground should exist between the tracks and air and water lines inside the mines.

An interesting power distribution system has been in service for several years at No. 2 Shaft, Williamstown Colliery, of the Susquehanna Collieries Co. Power is transmitted at 22 k.v. over a double circuit steel tower line from the Short Mountain Power Plant. Incidentally at this plant powdered anthracite is burned in suspension under the boilers which supply steam for pumping at Short Mountain and for the turbines which generate electric power for the entire division.

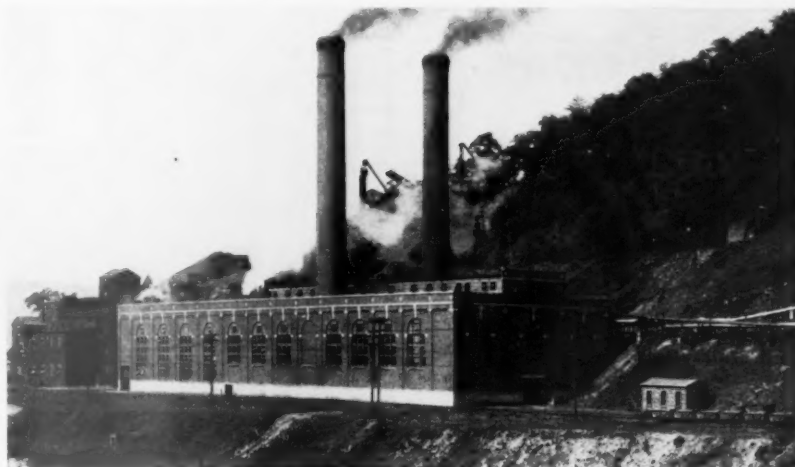
At No. 2 Shaft three banks of transformers are installed, each bank consisting of three 833 k.v.a., 22,000-2,300 volt outdoor transformers. A steel switch structure at each bank mounts a three pole remote controlled disconnecting switch and horn type fuses for overload protection. Additional disconnecting

switches mounted on steel poles are arranged for switching any or all banks of transformers to either or both of the 22 k.v. lines.

The switchboard in the substation consists of three incoming panels equipped with remote control oil circuit breakers and necessary accessories, one for each transformer bank. Reverse power relays clear any transformer bank in case of trouble. Bus type current transformers are connected to trip off all transformers in case of trouble on the station bus, and for operating the totalizing meters. Oil circuit breakers are tripped by 12 volts direct current supplied by a battery which is kept charged by a small rectifier.

In this station two 3,300 cu. ft. air compressors and two 300 k.w. motor-generators are in operation. Control for these motors is assembled as a part of the substation switchboard. Outgoing 2,300-volt feeder lines handle fans, hoists, and pumps, consisting of nearly

*(Concluded on page 53)*



*Lykens Power Plant*

\* Electrical engineer, Susquehanna Collieries Co.



# Haulage and Hoisting at the Mines of the Inspiration Consolidated Copper Co.

By A. C. STODDARD\*

**I**N A MINING operation the haulage of material underground and the hoisting of this material from underground to the surface is a major operation. The success of the whole mining venture may be dependent on the efficiency of these two operations. The cost of the two operations is a considerable portion of the total underground cost. Inasmuch as the two operations are closely related, they should be considered as a whole rather than separately if the best results are to be obtained.

For efficient haulage there should be easy and sufficient loading capacity. The tracks and rolling equipment should be maintained in good condition. This insures prompt and steady movement of the loads to the place of discharge. The place of discharge should have sufficient storage capacity that if hoisting were delayed for a reasonable time that haulage could be continued, or if haulage were delayed there would be a supply of ore such that hoisting could continue. At the discharge end of the hoisting there should be storage so that a reasonable delay in the flow of the ore away from the hoisting facilities would not stop hoisting. Major disturbances anywhere along the line interrupt the sequence of the haulage and hoisting operations, and the time and tonnage so lost can never be regained except at the expense of overtime. The record at Inspiration for large tonnages hoisted and hauled at excellent costs have been made on account of close attention to all details and to sufficient storage at all terminals.

Both compressed air haulage and trolley electric haulage are used underground, with the air haulage being discarded for electric haulage as rapidly as possible. At the time of bringing the mines of the Inspiration Consolidated

into production there were new and drastic labor laws in effect in the State of Arizona, and it was believed that compressed air haulage would be safer than trolley electric haulage under the conditions of intensive operation that were planned and that were necessary for the heavy production. Time has proven that compressed air haulage, under Inspiration conditions, did not have all the safety characteristics anticipated. Nor was it as economical as anticipated.

Haulage track is laid with 40 and 60 pounds to the yard rail to a gauge of 30 in. Frogs are of solid manganese steel. Ties are 6 by 8 in. by 5 ft. 2 in., sawed Oregon fir. Angle bars are used for rail joints. Ties are protected with tie plates and all curves have rail braces. A few metal ties have been used on curves. Track is well ballasted and aligned, on heavy, fast traffic sections crushed rock from the surface has been used for ballast. Curves are of 60 ft. radius as a minimum. Grade 0.4 percent in favor of the loaded trains.

In a congested traffic area switches are thrown electrically from a central location. The operator here is in touch with all train movements. Automatic and manual control block signals are used for traffic protection. Numerous telephone connections are available for use by train men, by the central operator and at the dumping locations.

On account of the train tonnage and the number of train movements per shift neither storage battery nor storage battery-trolley locomotives were economically practical. Loaded trains

have a gross tonnage of from 175 tons to lesser amounts. The maximum number of cars used in a train is 25. Trolley locomotives equipped with a gathering reel have made it possible to operate the electric locomotives in heavy drifts. In drifts where the timbering is crushing a naked trolley wire would be dangerous.

Six shafts and three tunnels serve the mines of the Inspiration Consolidated Copper Company. Three shafts furnish the ore hoisting facilities for the mines. The other shafts and tunnels are used either for ventilation or the movement of men and supplies.

At the Main Inspiration Shafts there are two shafts 102 ft. center to center. Both shafts are identical in size, 19 ft. 1 in. in the clear length by 5 ft. 6 in. in the clear width. Each shaft has three compartments each 5 ft. 11 in. by 5 ft. 6 in. Dividers are 8 in. Both shafts are reinforced concrete from top to bottom. There are skip loading stations in the Main East, Inspiration, shaft, at 508 ft. and 743 ft. from the collar. This shaft is 802 ft. deep and is the three compartments for the full depth. Storage for car dumping is provided at each station. The Main West shaft is three compartments for 584 ft. and then is one compartment for an additional 126 ft. Numerous connections have been driven between the two shafts. This West shaft has skip loading facilities at the 508-ft. depth.

Each shaft has two skip hoisting compartments. The third compartment in the Main West shaft is equipped with a double decked Otis elevator. The third compartment in the Main East shaft carries the ladderway, the air and water pipes, electric conduits and the counterbalance for the elevator. The skips operated in these shafts have a capacity

\* Chief mining engineer.





*Main Shaft, Inspiration Consolidated Copper Co.*

of 14 tons but the load is usually kept at 12.5 tons. Hoisting speed is 750 ft. per minute. All hoisting is done in balance. Movement of the skips can be controlled by an operator on the stand in the hoist house or automatic, starting and stopping, control can be used or the movement of the skips can be controlled by the operator on the skip loading floor. Capacity of the shafts varies with the control. With the automatic control the capacity is 75 skips per hour in the two shafts. With the control on the skip loading floor the capacity is increased to 105 skips per hour or 1,312 tons. All hoists are electrically operated.

The other ore hoisting shaft is the Main Live Oak shaft. This is a reinforced concrete shaft 1,403 ft. deep. This shaft is of four compartments. Two skip ways, one cage way and one compartment for the ladderway, pipes, conduits and cage counterweight. The skip compartments are the same size as the skip compartments at the Main Inspiration Shafts. Skips are of the same size and interchangeable from shaft to shaft. It is usual, however, that skips taken from one shaft to be repaired are returned to the shaft from which they were taken. In this Main Live Oak shaft there are four loading stations. Storage for car dumping is provided at each station. Hoisting speed for the skips is 1,500 ft. per minute though if it is necessary this speed can be increased to 2,200 ft. per minute. Control is the same as at the Main Inspiration Shafts.

At both the Main Inspiration shafts and at the Main Live Oak shafts storage is provided at the skip dump locations so that minor interruptions in the flow of the ore away from the shafts will not curtail hoisting operations. During the 18 years since production started at the Inspiration there has never been a complete interruption of hoisting and haulage due to operation failures. The

record day's tonnage produced through the three shafts was 25,728 tons and the record month's tonnage is 692,251. Such tonnages even more particularly require close coordination of production, haulage, hoisting and the disposal of the hoisted product.

The air locomotives in use are of the cross compound type, weight 10 tons on the four drivers. Air is compressed to 1,000 pounds by either or both of two 4-stage compressors which have a capacity of 1,125 cu. ft. of free air per minute. The locomotives have a capacity of 105 cu. ft. of air in the main reservoir. Charging pressure is 850 pounds. The air enters the high pressure cylinder at 250 pounds and exhausts into the low pressure cylinder at 125 pounds. The electric motors in use weigh eight tons and have two HM839-250 volt motors. Each motor is geared to one pair of driving wheels. Each locomotive has two trolley poles so that a trailing pole can be used at all times. Heavy protection is provided at each end of the locomotive for the motorman and the motor helper.

Cars for underground haulage are of two types but of approximately the same cubic feet capacity, 100 cu. ft. or 5 tons. One type is just a box mounted on four wheels and is dumped in a five-car tippie. All cars are of solid steel construction. The other type is an A bottom side dumping car. The original bearings under the cars were of the half brass type. The first roller bearings were of the Hyatt type. Both of these types of bearings are being replaced with Timken bearings as rapidly as major repairs on the cars are required.

Dumping equipment for the box type cars is a five-car tippie, electrically operated, that revolves through 360 degrees. Each station at the Inspiration Main Shafts, on the sixth level, is equipped with a tippie. Both tipples are operated from a central location by one

man. With two tipples continuity of at least partial production is assured. All other dumping locations are served by the side dumping cars. Storage is provided at all dumping locations. The amount of storage capacity varies from 1,500 to 600 tons being dependent on the production hauled to the dumping location.

## **Copper Industry of Arizona—Present and Future**

*(Continued from page 14)*

foreign trade and will sell some of its production to the world at large at world prices, the surplus will be reduced more rapidly.

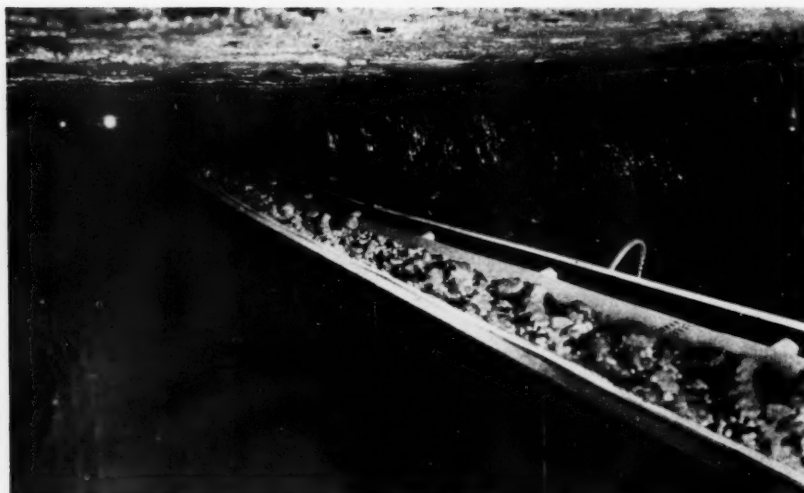
The new economic set-up of the industry is a much more permanent thing than surplus, but there are too many copper mines and that the poorest ones can no longer compete is a fact that must be faced. If the industry will forget about price fixing and will sell copper in the foreign market, if it will reconcile and adjust itself to a low selling price, and if it will produce only as it can sell, then we believe there will be maximum consumption of copper and a sound industry.

Under these conditions, the outlook for Arizona is not hopeless. Considerably more than half of the old copper industry should survive and carry on. Some shrinkage is inevitable and the population of the state and the cost and scale of state government must be adjusted to the new situation. Revival of the industry must be helped and not hindered, and a fair and intelligent tax law must be written.

If the industry is willing to pay for its mistakes, the situation is clarified. If it is asking Uncle Sam to pay for them, it is more obscure.

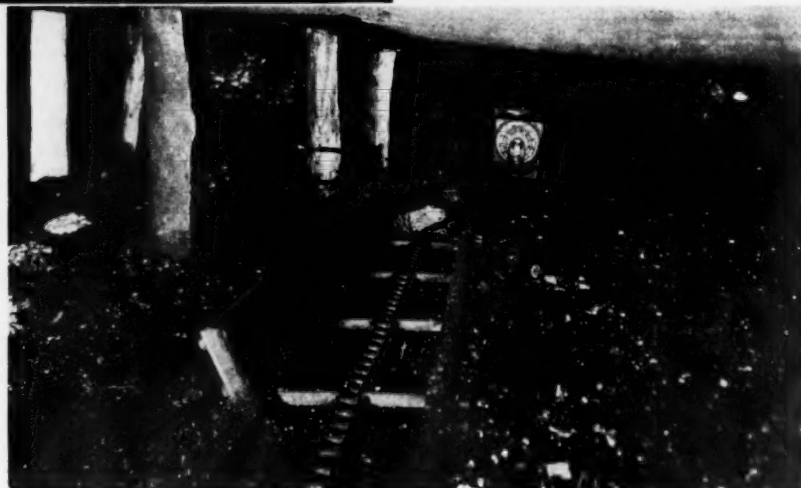
# A Complete Panel Mining With Conveyors

By RICHARD TODHUNTER\*



*Above—Main Belt  
Conveyor, 1,400 ft. long*

*Right—Chain Conveyor  
at Room Face*



THE Barnes Coal Company have developed at their No. 15 Mine at Binder, Pa., a system of multiple unit conveyor mining. At this operation all the work in a panel—from driving the entries to recovering the room and chain pillars—is done with conveyors. The mine cars are loaded on the main haulageway at the intersection of the panel headings and no mine cars are used in the panel workings.

The seam has 38 in. of clean coal of high quality in the middle bench. Above this there are from 10 to 14 in. of boney coal and underneath the middle bench there are 18 to 18+ in. of bottom coal. Because of the high quality of the middle section it is desirable to confine the working to this part of the seam, leaving the top boney coal in place and taking the bottom coal only where height is necessary. In order to mine a greater percentage of the output from the 38-in. section, conveyors were adopted as being more economical than mine cars—both for the actual loading operation and because they would reduce the amount of bottom lifting required.

Conveyors were first installed in October, 1931, and by the end of January, 1932, a pair of entries had advanced 1,650 ft. This developed the system of complete conveyor mining as shown in Figure 1. This consists of a panel 700 ft. wide by 1,600 ft. long, with a pair of headings driven lengthwise through the center and rooms 300 ft. long worked to the right and left. The entries are driven to the panel limit before any rooms are started and the entire block is worked retreating. A belt conveyor, 26 in. wide, is installed in one of these entries and conveys the coal from the room conveyors to the

\*General manager, Barnes Coal Co., Barnesboro, Pa.

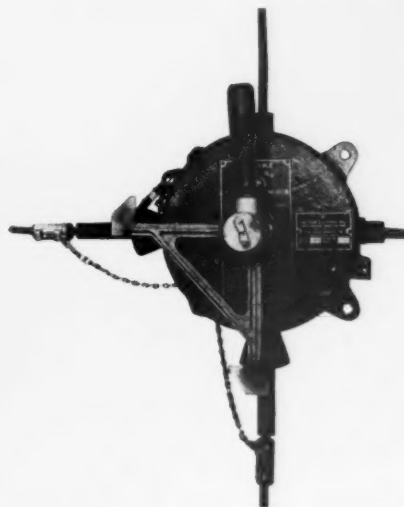
mine car haulway on the main heading. This belt conveyor is 1,400 ft. long and is built in 200-ft. sections so as to be shortened as the panel retreats. At the mine car loading point the side track is arranged so that 30 empties can be placed at one time by the main line locomotive. This trip is moved past the loading point by a rope hoist.

Four rooms are worked at one time—two to the right and two to the left. The rooms are turned on 75-ft. centers—driving the rooms 45 ft. wide with a 30-ft. pillar between. Room cross cuts are made every 90 ft. The entry for the main belt conveyor is 12 ft. wide and the air course or back heading is 18 ft. wide. The top boney coal, 10 to 14 in. thick, is taken on the conveyor haulway and in the room necks but in all other workings of the panel only the 38-in. section of the seam is mined. This confines the brushing to one 1,600-ft. entry, in a panel 700 ft. wide.

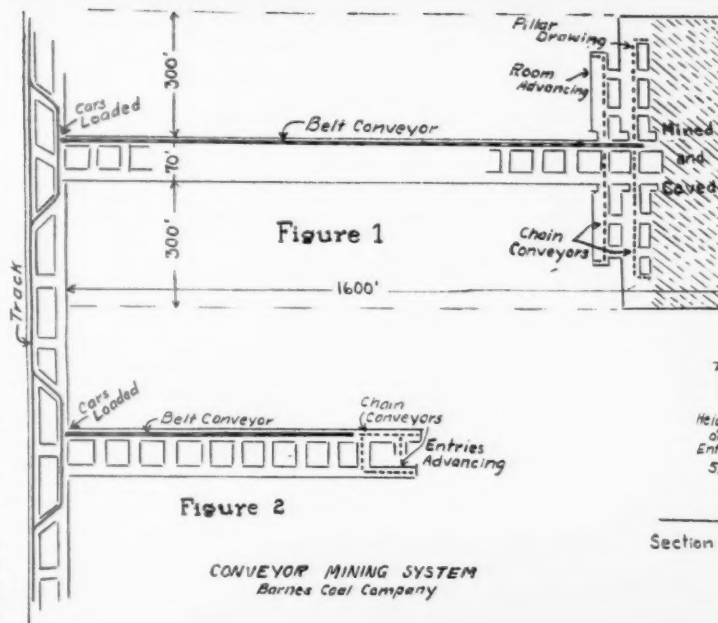
Each room has a face conveyor of the drag-chain type. The room conveyors are of the chain type and discharge on to the main haulage belt which extends down the panel to the main headings. The main and room conveyors are reversible to carry material and supplies to the face. All of the conveyors were furnished by the Jeffrey Manufacturing Company.

The face conveyors are driven by a 5-hp. motor, the room conveyors by a 10-hp. motor and the main belt conveyor by a 25-hp. motor. The motors were furnished by the Westinghouse Company, and are 250 v. d. c.

The line equipment for distributing power to the various units was furnished by the Ohio Brass Company. The main cables are lengthened by inserting quick break cable connectors at 300-foot units.



Ohio Brass Gas Proof Fused Junction Boxes Used to Connect Main Cables With Those Going to Conveyors



The main three conductor cables leading to the room conveyors connect with the three main cables through a movable junction box. The face ends of the main cables are provided with Ohio Brass strain insulators. All conveyors can be stopped by a switch at a main haulage-way at the end of the belt conveyor where the mine cars are loaded. Each room and face conveyor has its own control switch where it may be started or



Main Belt Loading Mine Car

stopped independently of the others. Bell signals and a telephone provides communication from the faces to the mine car loading point.

At the present time there is one complete unit in operation as shown on the sketch in Figure 1. This so far has mined 80,000 tons and its operation has been highly satisfactory to the management. Two additional main belts each 1,400 ft. long have been ordered and the development for two additional panels will be started as soon as this equipment is delivered.

The panel entries are driven from the main heading 1,600 ft. to the barrier limit with conveyors arranged as shown in Figure 2. The belt conveyor extends to within 200 ft. of the face and is extended in 200-ft. units as the head-



Room Conveyor Loading on Main Belt

ings advance. A series of chain conveyors arranged as shown in Figure 2, are used for the actual entry driving. Each entry has a crew of two men who do all the work of cutting, drilling, timbering and loading. The haulage entry is driven 12 ft. wide with 10 to 14 in. of the top boney coal taken for height. The back entry of air course is driven 18 ft. wide in the 38-in. section of the seam. The crew of four men for both entries will clean up an average of three cuts 6 ft. deep in each heading per shift. Both places are worked double shift. At this rate a panel entry has been driven a distance of 1,650 ft. in 72 working days.

A crew of three men is used in each room. Rooms are driven 45 ft. wide with a 30-ft. pillar between. This pillar is recovered as soon as the room is driven up as shown in Figure 1. The three men do all the work from cutting to loading at the face and their present average is 65 tons from each room in an eight-hour shift. An average of 18 days double shifting is required to drive a room a distance of 300 ft. and recover the pillar. Chain pillars are recovered by the room crew as soon as the room pillar is mined out down to the entry. The coal recovery is approximately 98 percent.



# Milling Methods at the Lead-Zinc Concentrator of the International Smelting Co.\*

By W. J. McKenna†

THE concentrator is operated as a unit of the International Smelting Co. and is located about 40 miles southwest of Salt Lake City, at Tooele, Utah. The Tooele Valley Railroad, operating between the plant and Warner, Utah, a distance of 6.5 miles, makes connection with both the Union Pacific and Denver & Rio Grande Railroads. It operates as a custom lead-zinc mill, treating approximately 1,150 tons per day entirely by flotation methods. The resulting lead and iron concentrates are smelted locally, and the zinc concentrates are shipped to the Anaconda Copper Co. plants at Anaconda and Great Falls, Mont. In general, the concentrator consists of a frame building housing the coarse crushing, fine grinding, flotation, concentrate thickeners, and filter equipment. Fresh water is piped a distance of 3 miles from mountain springs to a 412,000-gallon capacity concrete storage tank.

Electric power is supplied by the Utah Power and Light Co. at 44,000 volts and transformed to 440, 220, and 110 volts for use in the concentrator. Steam power is generated at the centralized smelter power house and distributed to the concentrator at 100 pounds' pressure.

The major sources of ore supply have been from the Park City and Bingham, Utah, mining districts. Lesser but important amounts have been received from the Tintic, Frisco, and Ophir, Utah, districts and the adjacent States of Colorado, Idaho, and Nevada. Materials from the above sources include crude sulphide ores and gravity-mill table middlings and slimes.

It is evident that ores shipped from so many different mining districts would vary in general characteristics and metal contents. A typical analysis of a mixture of crude ores and gravity-mill products follows:

PERCENT				OUNCES PER TON	
Lead	Copper	Zinc	Iron	Gold	Silver
8.62	0.42	11.23	9.75	0.137	7.10

Owing to the several different ores received, only more or less general descriptions can be given of their mineral contents.

The copper content, while low, is present chiefly as chalcopryrite and tetrahedrite, with minor amounts of covellite and bornite. The lead mineral, galena,

varies from the fine-grained steel galena to the coarse crystalline variety, the latter often showing slight surface oxidation. Daily determinations of oxide lead in the mill feed shows an average of 0.10 percent. The precious metals generally follow the copper minerals and galena, although gold is associated with the pyrite to a large extent in most of the ores. Zinc occurs mostly as a true sphalerite, which has a light resin color. The predominating gangue is hard quartzite, although several ores contain soft talc-like gangue which causes considerable difficulty in the settlement of tailing.

Average moisture content of ore receipts is 4.5 percent. Mixing the dry and sticky ores tends to eliminate most of the difficulties experienced in handling them.

Before presenting the historical facts of the concentrator operations, it might be of interest to discuss briefly the problems which confronted the lead-smelting industry of this territory from 1918 until the introduction of selective flotation methods. The oxidized silver ores contained excess quantities of silica and the zinc content of the lead-silver sulphide ores was increasing. The elimination of silica and zinc in lead blast furnace operations required fluxing with iron, but it was difficult to obtain suitable iron ores for this purpose. A careful survey of the situation by the geological department in conjunction with the flotation testing laboratory staff revealed that a selective flotation process would accomplish: (1) The elimination of silica from the lead-silver sulphide ores; (2) the removal of zinc from many ores into a separate concentrate, thus bringing a revenue rather than a penalty to the shipper; (3) the production of an iron concentrate from the pyrite content of the sulphide ores; and (4) the

grinding unit of one 500-ton section and to rearrange the entire Callow equipment into a suitable flow sheet for the operation of three different circuits; namely, lead, zinc, and iron. Installation of additional concentrate thickening and filter equipment was also necessary.

The capacity of the concentrator was increased 500 tons per day early in 1925. Minerals Separation Sub-Aeration machines were selected for the flotation equipment of this addition. The present flow sheet of the mill uses both Callow and Minerals Separation in each section rather than entire sections of each type.

Figures 2 and 3 present flow sheets of fine grinding and flotation of section 1, respectively. The treatment in section 2 is similar to that of section 1, except that two 14-cell, 18-in. Minerals Separation machines are used in the zinc rougher circuit in place of the 4-cell M.S. conditioner and four 8-pan Callow cells as shown in figure 3.

Custom ores are crushed and sampled at the smelter sampling mill. The final product, which is discharged from a Symons cone crusher set at a  $\frac{3}{8}$ -in. opening, is conveyed to one of 10 storage bins having a total capacity of 2,250 tons.

Mixtures are made of the various ores according to the amenability of the individual ores to the general reagent combination as applied to the basic ore being treated at that time, predetermined by batch laboratory tests or previous treatment at the concentrator. The ores entering the mixture are fed from the storage bins onto a long conveyor belt extending the entire length of the bins and discharged into 50-ton-capacity, bottom-dump railroad cars, which are later dumped into a receiving pocket at the concentrator. From the receiving pocket the ore is conveyed and elevated to either section 1 or 2 ball mill feed bins, thereby by-passing the concentrator crushing equipment.

Gravity-mill products received from other mills are first pipe-sampled and then introduced into the regular mill feed, by loading small amounts on the mixture cars by a locomotive crane.

Company account ores shipped from Bingham over the aerial tramway are dumped and crushed at the concentrator. Every fifth bucket, however, is sent to the smelter sampling mill for weighing and sampling.

Apron feeders deliver the ore from the coarse-ore bins at the concentrator to a 30-in. inclined conveyor at the rate of 125 tons per hour. The conveyor is direct driven by a 25-hp. motor and discharges onto a stationary grizzly having 2-in. spaces. The grizzly over-

mining of lower grade ore deposits heretofore considered unprofitable.

With these possibilities in mind, the company pioneered in the establishment of a central custom mill in 1924, purchasing lead-zinc ores on schedules based upon the actual recoveries made and grades of concentrates produced. At this time the company was operating a 1,000-ton-capacity copper flotation concentrator treating the ore from the Utah Delaware mine in two 500-ton-capacity sections. In order to treat approximately 500 tons of lead-zinc iron ores per day it was necessary to use the fine-

\* Reprinted from U. S. Bureau of Mines Information Circular 6758.

† One of the consulting engineers, U. S. Bureau of Mines, and concentrator superintendent, International Smelting Co.

size passes to a No. 6 Telsmith gyratory crusher with the discharge set at approximately 2 in. The average life of the manganese-steel mantle and concaves, when handling 575 tons of ore per day, is 2½ years.

The grizzly undersize and crusher product are conveyed to a 30-in. elevator equipped with a double row of 14 x 7-in. manganese-steel buckets, which discharges over two 4 x 6-ft. Mitchell Hum-mer screens having 1¼-in. holes.

The screen undersize goes to the ball-mill feed bins and the oversize goes to a set of 54 x 20-in. Traylor heavy-duty rolls. The rolls shells are made of forged steel and show a consumption of 0.024 pound per ton of ore crushed. The rolls are operated at a speed of 95 r.p.m. and are belt driven from a line shaft which also drives the crusher. A 150-hp. motor is used for operating the crusher and rolls.

Referring to figure 2, the fine grinding equipment of each 500-ton section is identical and is of the two-stage type. Each section has a 650-ton-capacity fine-ore bin from which feed is drawn by means of ratchet-driven belt feeders discharging onto a 16-in. conveyor belt. The ore is carried by this belt over a Merrick weightometer to the double-scoop feeder of an 8 x 6-ft. Allis-Chalmers grate-discharge ball mill, which operates in closed circuit with a 6 x 18 1/3 ft. Dorr duplex classifier and constitutes the primary grinding circuit. The overflow from the primary classifier is equally divided between two secondary 6 x 21 2/3-ft. Dorr duplex classifiers, each operating in closed circuit with a 5 x 12-ft. Worthington ball mill. The overflow from the secondary classifiers comprises the flotation feed.

The primary mills are operated at a speed of 18.7 r.p.m. and are driven by 200-hp. induction motors, connected by means of Link-Belt drives. Cast-iron balls, 3-in. diameter, are used and are manufactured at the foundry of the Anaconda Copper Mining Co. at Anaconda, Mont. Ball loads amount to 27,000 pounds. Feed end and shell liners are made of manganese steel, and the grate sections are made of tool steel. Pulp density in the primary mills is maintained between 72 and 75 percent of solids.

The secondary mills operate at a speed of 27.2 r.p.m. and are driven by 100-hp. induction motors, as well as through Link-Belt silent-chain drives. Balls used are 2-in. cast iron, also manufactured at Anaconda, Mont. Ball loads carried are 14,000 pounds per mill. Feed end and shell liners are made of hard white iron. Pulp density in the secondary mills is maintained between 68 and 70 percent of solids.

The following tabulation shows liner and ball consumptions, in pounds per ton of primary mill feed, for the primary and secondary mills:

	Liners and grates	Balls
Primary mills, pounds.....	0.30	2.30
Secondary mills, pounds.....	.20	1.14

Screen analyses of grinding-circuit products are given in table 1. It should be noted that the figures given in table 1 represent a period in which extra fine grinding was practiced. More typical examples of screen sizes of classifier overflow and flotation tailing are presented in table 2.

TABLE 1.—SCREEN ANALYSES OF GRINDING-CIRCUIT PRODUCTS

Screen size, mesh	WEIGHT, PERCENT						
	Primary ball mill feed	Primary classifier sands	Primary ball mill discharge	Primary classifier overflow	Secondary classifier sands	Secondary ball mill discharge	Secondary classifier overflow
+ 48	75.3	61.0	30.2	12.7	14.4	1.5	...
+ 100	6.0	23.7	19.7	20.4	33.4	8.7	3.9
+ 200	4.8	7.6	13.9	15.7	28.3	22.6	12.6
- 200	14.9	7.7	36.2	51.2	23.9	67.2	83.5

TABLE 2.—TYPICAL SCREEN ANALYSES

Screen size, mesh	WEIGHT, PERCENT	
	Secondary classifier overflow	Flotation tailing
+ 65	1.0	2.0
+ 100	5.6	9.0
+ 150	7.4	12.0
+ 200	11.6	14.6
- 200	74.4	62.4

The 6 x 18 1/3-ft. primary classifiers have a slope of 3½ in. per foot and operate at a rate of 26 strokes per minute. The 6 x 21 2/3-ft. secondary classifiers slope 2¾ in. per foot, and their rakes operate at a speed of 22 strokes per minute. The secondary classifier overflow pulp, which is flotation feed, is maintained between 22 and 24 percent of solids.

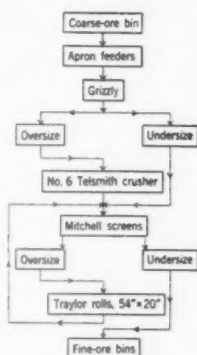


Figure 1.—Flow sheet of crushing plant.

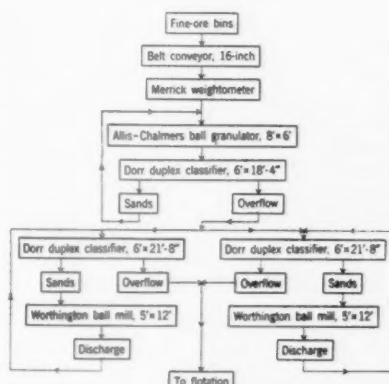


Figure 2.—Flow Sheet of Grinding Plant

#### Flotation

Referring to figure 3, the secondary classifier overflow pulp from each grinding section is conveyed by launder directly to flotation. Present practice follows the use of two 14-cell 18-in. Minerals Separation Sub-Aeration machines

for the lead circuit roughers of each section. The zinc rougher circuit of section 1, as previously described, consists of four 8-pan Callow cells, while the zinc rougher circuit of section 2 employs two 14-cell 18-in. Minerals Separation Sub-A. machines. Callow cells are used in the iron rougher circuits of both sections, and also for cleaning all lead, zinc, and iron rougher concentrates produced in either section.

The line shaft of each M. S. machine is driven by a 40-hp., silent chain drive at a speed of 380 r.p.m. The spindle shafts are driven at a speed of 331.3 r.p.m. from the line shaft through bevel gears. The peripheral speed of impellers is 1,560 ft. per minute.

Impellers are 18 in. in diameter, full double-disk type, and are made of hard white iron. Their average life is 5 to 7 months, depending upon whether in lead- or zinc-circuit service.

Callow cell pans are the standard 3 x 3-ft. type equipped with 3-ply 18-ounce canvas blankets. Average life of cell blankets is 90 days.

Rougher lead concentrate is removed from the first four to six cells of the M. S. machines and cleaned in a 3-pan Callow cell. The cleaner tailing, together with the froth from the remaining cells of the M. S. rougher machines, is returned by bucket elevator to the head of the lead circuit. Tailing pulp from the lead circuit is pumped to a 30-ft. Dorr thickener, from which the underflow is conveyed by gravity to the head of the zinc-rougher circuit. The Dorr thickener functions as a pulp conditioner, giving the pulp a longer time of contact with flotation reagents, and also as a regulator of the density of the feed to the zinc circuit.

Steam is introduced into the lead-circuit tailing pulp before it enters the zinc-rougher cells. The temperature of the pulp in the zinc circuit is maintained at about 30° C.

In section 1 a conditioner is provided between the Dorr thickener and the Callow zinc circuit. The conditioner is a 4-cell, standard M. S. machine, with 24-in. cruciform agitators driven by a 25-hp. motor through Tex-ropes. The flow sheet of section 2, which employs M. S. Sub-A. machines in the zinc circuit, contains no conditioner between the Dorr thickener and the zinc circuit.

The froths from the first three pans of each Callow zinc rougher are combined and double-cleaned in 6-pan Callow cells.

The froths from the first four to six cells of each of the section 2 zinc rougher machines are combined and double-cleaned in two 3-pan Callow cells.

Middling and cleaner tailing from the zinc circuits of each section join the tailing from the rougher lead circuits of their respective sections and are pumped to the 30-ft. Dorr thickeners previously mentioned.

Tailing from the zinc-rougher circuit of each section comprises the feed to the iron circuit. In section 1, rougher-iron concentrates are taken from the first four pans of each of two parallel 12-pan Callow cells. The rougher concentrate is cleaned in a 6-pan Callow cell. Rougher-iron concentrates in section 2 are taken from the first three pans of each of two parallel 8-pan Callow cells and cleaned in a 6-pan cell. Middling and cleaner tailing are returned to the head of the iron circuit of each section. Tailing from the iron circuits of each section is thickened and sent to the tailing disposal pond.

Soda ash is used in amounts of from 0.1 to 2.0 pounds per ton of ore as a conditioning reagent. It is added to the primary ball mill and to the lead-circuit tailing.

Sodium cyanide is fed to the primary ball mill as a 20 percent solution, in amounts of from 0.2 to 0.3 pound per ton of ore.

Zinc sulphate is fed to the primary ball mill as a 15 percent solution in amounts varying from 0.6 to 1.3 pounds per ton of ore.

Sodium aerofloat is fed dry to the primary ball mill in amounts of 0.1 pound or less per ton of ore.

Potassium ethyl xanthate is fed as a 15 percent solution to the heads of the lead and zinc circuits in amounts of 0.03 to 0.04 pound per ton of ore and to the head of the iron circuit in amounts of 0.15 to 0.30 pound per ton of ore.

Aerofloat No. 15 is used at an average rate of 0.15 pound per ton of ore as a collector and frother in the zinc circuits.

Copper sulphate is added dry, in fine crystalline form, to the lead tailing ahead of the zinc circuit at the rate of 1.25 to 1.50 pounds per ton.

Potassium amyl xanthate is fed to the iron circuit as a 15 percent solution.

All flotation reagents which are fed in aqueous solution are distributed from disk-and-cup feeders, there being a separate feeder for each point of addition. Aerofloat is fed from either disk-and-cup or Geary feeders. Dry reagents, such as copper sulphate, soda ash, and sodium, aerofloat are fed from belt-and-hopper feeders.

Three No. 6½ Roots blowers, two of which are operated at a time, furnish air for the Callow and Minerals Separation Sub-Aeration flotation equipment and the Oliver filters.

These blowers each have a capacity of 5,200 cu. ft. of air per minute at 4½ pounds' pressure. The air is distributed

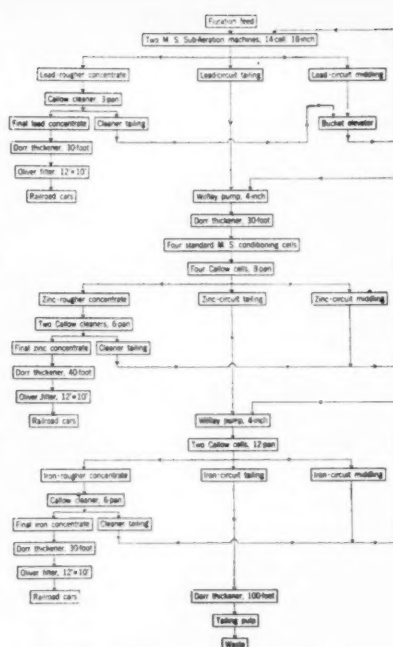


Figure 3—Flow Sheet of Flotation and Dewatering of Section 1

to the Callow cells and Oliver filters at a pressure of 4½ pounds per square inch and to the M. S. machines at 16 ounces per square inch. Average volumes of air used are 7 cu. ft. per minute per square foot of Callow cell pan area and 20 cu. ft. per minute per cell for the M. S. machines.

The blowers are located in the grinding division of the concentrator and are all connected to a main header pipe from which air is distributed to the flotation and filtering divisions. Each blower is belt driven by a Lenix drive at a speed of 225 r.p.m. by a 150-hp. induction motor.

Average analyses of heads and products of flotation operations and average recoveries are given in table 3. Metallurgical data for February, 1931, are presented in table 4.

The equipment for concentrate thickening includes three 30 x 10-ft. and one 40 x 10-ft. Dorr thickeners. One of the 30 x 10-ft. thickeners handles lead concentrates from both sections, another of the same size is used for the iron concentrate, and the 40 x 10-ft. thickener is used for the zinc concentrates of both sections. A spare 30 x 10-ft. thickener is available for emergency use or for the separate thickening of any product from either section if desired.

The pulp density of the concentrate pulps entering their respective thickeners is approximately 20 percent of solids. Thickened pulps containing 50 to 60 percent of solids are elevated to Oliver

drum-type filters. The thickener overflows are combined and form an important portion of the return circuit water.

The filtering equipment consists of four 12 x 10-ft. and one 12 x 12-ft. Oliver drum-type filters. It is seldom necessary to use more than one of these filters for each concentrate. However, the two extra filters permit the filtering of special concentrates and eliminate lost time in operation when repairs are necessary.

It is customary to thicken and filter a portion of the iron concentrate with the lead concentrate, the amount depending upon that desired for sintering and fluxing operations at the smelter.

The moisture content of the filtered concentrates follows:

Percent moisture	
Zinc concentrate .....	5.3 to 10.0
Lead-iron concentrate .....	6.5 to 9.5
Iron concentrate .....	7.5 to 10.0

The variation in moisture content is due to the character of the gangue in the ore treated. The filters are operated at a speed of one revolution in 10 minutes and have an average capacity of 800 pounds per square foot per 24 hours.

A vacuum of 21 in. of mercury is maintained by two 22 x 8-in. Ingersoll-Rand type ER-1 vacuum pumps. Air for blowing is furnished by the flotation blowers at 4½ pounds' pressure per square inch.

Filter covers are of Palma twill canvas cloth and have an average life of 75 days.

The filter cake is discharged directly into railroad cars. Filtrate water is reclaimed and used in the return circuit water.

The final tailings from both sections, amounting to about 50 percent of the weight of ore treated, are conveyed by launder to a 100-ft. diameter Dorr thickener and thickened from 15 to 50 percent of solids. The overflow water, amounting to approximately 350 gallons per minute, is added to the return water circuit. The thickened tailing pulps are elevated by a 4-in. Wilfley pump to a launder and flow by gravity to impounding ponds located about 1½ miles below the concentrator. No attempt is made to reclaim any water from these ponds.

During each shift samples are taken of heads, lead concentrate, zinc concentrate, iron concentrate, and tailing of each section with standard automatic samplers. These samples are assayed daily for the purpose of metallurgical control and guidance.

The consumption of fresh water for metallurgical purposes amounts to approximately 115 gallons per minute, or is at a rate of 144 gallons per minute with a feed rate of 1 ton of ore per minute. This amount corresponds closely to the loss of water in the thickened

(Concluded on page 50)

TABLE 3.—AVERAGE ANALYSES OF FLOTATION PRODUCTS AND MILL RECOVERIES

	ANALYSES													
	Weight, percent	PERCENT					OUNCES PER TON		RECOVERY OR DISTRIBUTION, PERCENT					
		Lead	Copper	Zinc	Iron	Insol- uble	Gold	Silver	Lead	Copper	Zinc	Iron	Gold	Silver
Heads .....	100.00	8.62	0.42	11.23	9.75	...	0.137	7.10	100.00	100.0	...	...	100.00	100.00
Lead concentrate .....	12.60	64.02	2.00	7.67	3.33	3.33	.539	44.65	93.62	60.8	8.61	4.96	49.71	79.26
Zinc concentrate .....	16.41	1.19	.65	58.44	3.28	2.50	.116	3.67	2.26	25.8	85.44	5.52	13.86	8.49
Iron concentrate .....	15.74	.80	.18	2.71	41.50	5.37	.188	2.85	1.47	6.7	3.80	67.00	21.64	6.31
Final tailing .....	55.25	.41	.05	.44	3.98	...	.037	.76	2.65	6.7	2.15	22.52	14.79	5.94



# Relation Between Power Costs and Tonnage Mined

By W. E. WOLFE\*

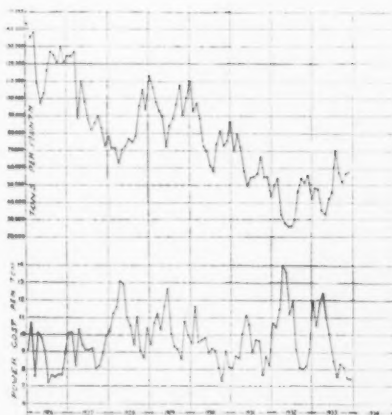
MUCH has been written on the subject of mine power. It is difficult and confusing to present an actual case of power distribution or assume a hypothetical one because of so many variables, both in mine power problems and mining conditions. Unless the article contains a discussion of specific variables and conditions that might be applicable to the reader's problems, it is of little value and interest to him.

I present for the reader's consideration a graphic chart of a group of mines geared for even higher production, showing tons mined and power cost per ton over a period of years from 1926 to 1933, inclusive (please note that the power cost is based on a flat rate per k.w.h.), thus eliminating our old enemies, demand and power factor penalties, and getting a true picture of power in kilowatt hours. It is the writer's hope that in the study of this chart, which I think is characteristic of a lot of coal mines, together with the following discussion and ramifications, there will be some points of interest and help to the reader.

Perhaps one of the most misleading conceptions is that power cost per ton will invariably fluctuate with the tonnage. While this is generally true, the point of difference is that it does not fluctuate in proportion to the tonnage. Too often, when one finds the power cost up and out of line, he habitually takes a glance at the tonnage and immediately reaches the conclusion that therein lies the cause. This is rarely, if ever wholly true. There are any number of things to happen that will cause a noticeable increase in power cost per ton. I wish to call your particular attention to the cost per ton of coal mined in the early fall and winter months as shown on chart. Select two months of approximately equal tonnage, one in the dry season and one in the wet season; the increased power cost will average over one cent per ton.

When the tonnage is seasonal, careful planning of substation locations with variable capacities is necessary in order to keep power cost in line. Wherever it is possible, it is advantageous to interconnect mines and substations with large capacity copper. I can think of no investment that pays larger dividends than mine copper. When the demand for power is great, copper pays its way in saving line loss as well as in armature and field coils. When the demand drops off, substation units can be closed down and still maintain proper voltage at the face, with the result that these no load losses can be credited to copper.

The advantage of interconnecting mines and substations is gained by a greater diversity factor and permits pumps and small equipment to be oper-



ated from a central substation on idle days and Sundays.

I realize when I advocate inter-connecting mines and substations in order to control no load losses and maintain efficient loads on the units, the wrath of many mine superintendents will fall upon the electricians who attempt it. They naturally expect frequent interruptions, reversed polarity and that they cannot obtain satisfactory parallel operation. When two motor-generator sets are close enough together to cause one or the other to motor under an ordinary load, they are close enough to be in the same station. Space does not allow me to discuss parallel operation. I can do no better than say if you are having any trouble, I refer you to the splendid article by M. S. Hancock in the November 1933 issue of *The Electric Journal*. Contrary to the editor's comments on this subject in the same issue, I still believe the engineers and manufacturers have something more to find out about the peculiarities of d.c. generators operating in parallel.

You will note from the chart when the tonnage dropped off in 1927 and 1928, power cost went up five cents per ton. In the latter part of 1929, a program was started to increase copper, electric weld bonding, rearrange substation units for proper paralleling and metering employees' houses, in fact a general power-saving program. As the result, in 1930 we have an unusual picture. The tonnage dropped off 50,000 tons and the power cost dropped .025 per ton. The point I

wish to bring out is that a carefully planned program of power economy, if systematically carried out, will reflect favorably upon the monthly cost sheet. About all that can be said of 1932, is that you are fortunate to be able to continue the chart in 1933; however, the fatality in 1932 chart is indicative of the culmination of a multitude of industrial evils committed in the years prior to the final reckoning.

Proper voltage maintained at the working face is prerequisite, the primary purpose of the whole scheme of power distribution is to accomplish this one thing. In as much as the mine track carries a large portion of the return current, it is a subject of great importance to the electrical department. As a matter of fact the track is a part of the electric circuits in the mines. Low resistance bonding of each track joint is essential. This is especially true of main line tracks. The joints can be quickly and accurately checked with a duplex milli-volt meter. A 45-pound rail joint properly bonded, should have a resistance of about 4 ft. of solid rail. Without a reliable instrument and systematic checking on the return circuit, one may expect a costly voltage drop at the working face.

It might be interesting to know that for the past three years the kilowatt hours on this chart were read twice daily, 6:00 a. m. and 6:00 p. m. which separates the mine load from the dead load. With this information, the chief electrician can very closely determine the no load losses, pumping load, light load, etc., showing him the way to excessive power consumers. Sub-metering will then accurately determine whether or not he can reduce this consumption.

We have a fairly good picture of power consumption in the mines, and I am sure it would be interesting to know something of our findings concerning the power used in employees' houses before and after metering the houses. Before installing meters in the houses, several meters were installed on the feeder lines of various groups of houses. One group of 18 houses used an average of 119 k.w.h. per house per month, another group of 15 averaged 56 k.w.h. per house, another group of 26 averaged 104 k.w.h. per house. A check on the above 59 houses showed an average of 97 k.w.h. per house. At this operation there were 386 houses not metered. Two years later, after meters were installed, a check showed an average consumption of 19 k.w.h. per house, a saving of 78 k.w.h. per house or 29,108 k.w.h. per month. Meters were conspicuously located for two reasons: To facilitate reading and to remind the tenant of its purpose. It is hard to estimate the psychological effect that meters have upon the personnel of an organization and the influence they exert in the saving of power.

\* Chief electrician, Clinchfield Coal Corporation.

## Still Need for a Protective Tariff

(Continued from page 11)

one and three-quarters millions of those blankets.

Of course, the American blanket manufacturers were up in arms and tried to have the case tested by the Treasury Department, but the Treasury Department decided they were within the law.

We had another condition something like it on linseed oil. It had a duty of three and three-quarters cents a pound. The second paragraph below that in the chemical schedule provided that mixtures of oils, mineral oil, vegetable oil, or animal oil, containing no essential oil and no alcoholic content, should be admitted at an ad valorem duty of 25 per cent, which of course was less than half the duty on linseed oil at three and three-quarters cents. That ran along for two years and then suddenly there appeared off New York and Boston and Baltimore and Jacksonville, tankers loaded with what was presumed to be linseed oil, but on the invoice it was described as 95 per cent linseed oil and 5 per cent soy bean oil, making a mixture of two vegetable oils, and the paragraph on oil mixture was applicable because they contained no essential oil and no alcohol and they brought them in on the 25 per cent ad valorem rate and cut the specific rate to about one and a half cent a pound by using the 25 per cent ad valorem. Of course, we cured that in the next bill, but it caused a great loss in revenue at the time.

Every attempt is made all through the existence of a tariff law to do what they do in taxation, to endeavor by legal avoidance rather than by illegal evasion to beat the Government. I have been sitting on the committee since last June, up to the middle of July and from the 16th of October, trying to see if we can't so correct the language by the aid of experts and what little gray matter some of the congressmen have left, to close up some of these holes of escape through which we have been losing millions of dollars of revenue during the last few years.

It is a most difficult thing because opposed to us are the keenest brains of the country in the legal profession who invent one new method as soon as we close the old one. That is the position that we are in. We are wondering how long what we have done now will last before some new method will be designed. I presume what saves their conscience is that they are doing it by legal avoidance rather than by illegal evasion.

It turned out in the Morgan and Mitchell hearings that they had been doing nothing but what they were permitted to do under the law, which was true. What we are trying to do is to remove those opportunities for so-called legal avoidance.

In the last tax bill that we wrote, the last revenue bill that we worked on, in which we cured some of these conditions in the 1932 act, we provided that these losses should not be taken next year or another year or when it was a convenient year for the man who had made the losses to take them, but that they should be taken in the year in which they occurred. We did many other things, and strange to say in this

1932 revenue act, we provided four distinctive tariff items. Two of them concerned the mining industry; certainly coal and copper interest the mining industry. I imagine that they are represented here. That tax on copper which took the place of something that had been neglected for a number of years, was equivalent to a tariff on copper, and is so defined in the law, and what perhaps is most unusual is to find under the title of manufacturers' excise taxes this tax on copper, but which, as I say, met with my approval because it was a tariff, and a tariff that was seemingly very necessary because of conditions in the copper-producing sections of the United States. There is no doubt as to its being a tariff because it states, "The tax on the articles described in this paragraph shall apply only with respect to the importation of such articles."

That phrase is used in connection with crude petroleum, the tax on the article and all its derivatives shall only apply with respect to the importation of such articles, and the same thing applies to copper, the same thing applies to lumber; there is a limitation on the coal paragraph, which says this: "The tax on the articles described in this paragraph shall apply only with respect to the importation of such articles and shall not be imposed upon any such article if during the preceding calendar year the exports of the articles described in this paragraph from the United States to the country from which such article is imported have been greater in quantity than the imports into the United States from such country of the articles described in this paragraph." So that, of course, has a very decided limitation, different from anything that has ever been put even in a tariff bill or a tax bill. But it was interesting to see that, in the stress and necessity that developed, the Congress went far enough to put four distinct tariff items into a revenue bill.

Along that line let me say to you that we had to fight that year for the manufacturers' excise tax. In my estimation, that is the only way we will be able eventually to balance our budget and keep it balanced in the country, with a low rate, not over 2 percent would be necessary, manufacturers' excise tax with a licensing system which prevents pyramiding as against the regular retail sales tax.

I intend to offer it at this session of Congress to take the place of the long list of nuisance taxes that are here. What did we do after we discarded the manufacturers' excise tax? We sent up amendments to the Speaker's desk and had them acted upon and we put in about 19 of the individual industries of this country and put them on a sales tax under the title of the manufacturers' excise tax. Here they are: Tires and inner tubes, toilet preparations, furs, jewelry, automobiles, radio and receiving sets, mechanical refrigerators, all sporting goods, firearms, shells and cartridges, cameras, matches, candy, chewing gum, soft drinks, gasoline, electric energy, and so on ad infinitum. We just picked out about 18 industries in the country and said, "We are going to put a sales tax on you." That policy is eminently unfair, as I think any member of this organization will admit, and

I hope to see the time that we will come to our senses as regards the equity of a general manufacturers' excise tax.

The argument used in opposition to it is this: I asked one man about it, I felt he was a well-balanced man and thought things through carefully, and he said: "It is too good a tax, Crowther. You will be getting rid of all our other taxes and raising the percentage year by year."

I don't think that is so. Some people argue that we are trying to do it by getting rid of income taxes and helping the wealthy. That is not true. The thought is that our income tax is an integral part, one of the foundation corner stones of our taxing system at this time, and I don't think that the manufacturers' excise tax or any other tax could displace it or would displace it.

You don't have to be a very deep student of economics to thoroughly understand that if you want a sound tax system for the country you have got to have a broad base and you have got to cover it all over with small units as near alike as you can, as close together as you can, productive steadily over a period of years instead of displacing 10 of those and putting 1 skyscraper there that for the present moment is productive of revenue but next year may not bring anything, it may drop down to two stories on that side. That is the policy that ought to be followed out. It is indicative in the returns, as we have gone on through this period of depression, that we have built these skyscrapers with the hope of great revenue and in the time when revenue is most needed those things have failed us. In a sense, the manufacturers' excise tax is only a spending tax, it is a spending tax really. If you don't spend very much you don't pay very much. The man who spends the most pays the most in taxes on a sales tax of that character.

There are thousands of things in connection with this that are interesting enough to talk on for the next two or three hours. I know your time is limited. I am glad to have had this opportunity to address you, and I hope that the developments under the New Deal will bring us no radical departure from sound governmental policies. I voted for this National Reconstruction Act, I voted for many of the acts as a Republican, with the idea that it was time for everybody to put their shoulder to the wheel regardless of politics or partisanship, and try to help the country out of the ditch of depression. Now I don't know whose fault it was that we got in, I am not going to let my party assume the whole of it by any means. It is our duty to put our shoulders to the wheel, as I say, every one of us. That is what we did in the last Congress and that is what we intend to do now.

So in spite of the talk of bilateral treaties, in spite of the talk of international relations, in spite of the talk of trading tariffs which cannot be consumed under the present treaties that we have containing the most favored nation clause—in spite of these prevailing conditions I am going to continue to be a protectionist, not only for the mining industry of the country but everything North, East, South, and West that is visibly affected and whose conditions may improve under the policy.

# ROOF CONTROL

By RAYMOND E. SALVATI\*

**A**LAYOUT of mine projections is first given to lead up to a better understanding as to the method of pillaring that this discussion will outline.

The average thickness of the coal is 50 inches. There are seven headings on the mains, and from there the main headings are divided into flat entries, of which six are driven. Off the flat entries, butt entries are driven, of which there are four; and off these butt entries the rooms are driven. All of the main, flat, and butt entries are on 60-foot centers, and these headings are driven from 16 to 18 feet wide. On the butt entries the rooms are driven on 62-foot centers and the lengths of butt entries are 1,888 feet which will give 25 rooms, by leaving a barrier of 200 feet between the first room and the last heading on the flat entry and a barrier of 200 feet between the twenty-fifth room and the first heading on the parallel flat entry. The rooms are driven 300 feet long. A 60-foot pillar is left between the butt-off of these rooms and the first entry of the next butt. On all the odd number of rooms, the first breakthrough is driven 50 feet and the next two on 80-foot centers, and the last breakthrough, which is the butt-off, on 90-foot centers; whereas in the even number of rooms, 90 feet is the center of the first breakthrough, the next two being 80 feet, and the butt-off 50-foot centers. This is done so as to stagger all breakthroughs, and in event of difficult roof conditions being encountered there will not be such wide areas. On the butt entries 45's are driven all the way across the four entries every 310 feet; these 45's are driven because of haulage.

The question of ventilation should be discussed next before going into the question of pillaring and the mines can not be called extremely gaseous mines but mines that generate on an average of 1,000,000 cubic feet every 24 hours. Gas is given off in solid coal, and we do have a small seam that is about 75 to 100 feet above the regular coal bed that after a pillar fall has been secured a

great quantity of gas comes from this seam. In this connection we must have a good quantity of air that sweeps all of our working places along the face of the falls to be sure no gas has accumulated after a fall is secured. Due to the generation of this gas all of our haulage is on intake. On the main entries, as outlined above, we have seven entries, of which the three inner entries are the intake and the two on either side of these are the returns. On the flat entries, of which there are six, the two inner entries are the intakes and the outer two the returns. On both the main and flat entries the haulage is on the inner entries, which, of course, is the intake. This assures us of the safety of always having our gathering and haulage locomotives on fresh air. Every third butt entry a heading is driven through from the butt heading to the air course on the flat entry above. These are called "bleeders." We have our fresh intake air sweeping at two or three places along the entire pillar line, and this air then goes over the falls and through the "bleeders." This assures us that any gas accumulation is taken from the falls into the air course and from there to the outside. There are times, when a fresh fall is secured, that this gas runs up as high as 2 to 2½ percent at the end of the falls. The air from the flat entry above dilutes this down to below 1 percent. A "regulator" is always placed in these "bleeders" so as to regulate the amount of air necessary. At certain times, in order to be assured that no accumulation of gas is on the falls, the gob line is flushed by opening these regulators and letting the entire split of air, or as much as possible, come over the falls. The reason the "bleeders" are driven every third butt entry is to be sure that if falls are so large and air will not pull through the first "bleeder," the second "bleeder" will take care of the situation, and so on through the third and fourth.

All of the butt entries are driven the length of the last room, which is the twenty-fifth, before any rooms are driven whatever, with the exception of 1, 2, 12,

and 13 rooms, and they are driven through from one butt entry to the next. This is done so as to cut down the distance that our gathering motors have to travel in going to and from the working places. This also gives the best possible haulage system and the maximum tonnage.

Before the pillar line is then started, the five last rooms of the butt entry are driven up and started back before any of the other rooms are started. As the pillar in the first room is started back and just as soon as a 45-degree line is reached, the next room is started, and so on. The rooms below this are so timed that when they reach the butt-off the pillars are ready to be drawn back. This means that the same track that is used in the first workings is also used in pulling pillars back. By being able to use this system it saves laying of track as well as cleaning up any falls, and the pillars are in good shape ready to come back, in comparison to where they are driven up and rooms left to stand. By driving 1, 2, 12, and 13 rooms it enables the motormen to go from one butt to the next along the entire pillar line with minimum loss of time. By driving the rooms and withdrawing the pillars at the same time it gives the following security:

1st. In case of "squeeze" or "ride" we have the solid coal for breaker line and can save much acreage due to this.

2nd. In mining the solid and pillar coal simultaneously, we have the economic saving in labor on track and cleaning up falls.

3rd. Maximum tonnage from pillar sections.

In connection with the track, 60-pound steel is used on main haulage, 40-pound on flat entries, and 24-pound on butts and rooms; 5 by 7 ties are used with the 60-pound steel, 4 by 6 ties on the 40-pound, and 3 by 6 ties with the 25-pound, with the exception of bridle bars being used in rooms.

There is anywhere from 350 to 1,100 feet of cover, which consists of a sandy shale and sandstone, and the bottom is a hard slate, which is very fortunate, as there is very seldom any "heaving." Especially is this true when the regular falls are secured and the pillars are kept on the 45-degree line. The roof material does not have a tendency to bend before breaking, like shale. If the greater percentage of coal is recovered in pillar extraction the roof breaks and the weight is relieved on the coal. Pockets are driven 16 feet wide with a 10-foot wing being left so as to protect the miner. Rooms being driven on 62-foot centers and an average of 18 feet wide, gives us an average pillar of 44 by 62 feet. This

\* Manager, Pond Creek Pocahontas Co.



gives us about 30 to 35 percent of coal in the first workings, leaving 65 to 70 percent of coal for pillar extraction. About seven cuts are necessary to cut through the coal in the pillars. After the first three cuts, the machine cuts through to the gob in this 10-foot wing so as to give good ventilation. I might add here that this 10-foot wing is only left when a fall has not been secured. After a fall has been secured and it falls close to the pillar, the pocket is "open-ended" and the miner places two rows of timbers to take the place of the 10-foot wing. This is for the miner's protection.

In this 44 by 62 foot pillar, two or three pockets are usually driven, depending upon how the fall follows the pillar. When the pillar is down to within 18 or 20 feet and it is too small for another pocket, the track is placed in the breakthrough and the upper end at the pillar is taken off. This is done to insure safety to the miner. When the 10-foot wing is not left, two lines of timbers, on 4-foot centers, staggered, are carried along the right of pocket between gob line and the miner. I might mention here that the company is very fortunate in having our overburden so good, as it makes the top good in the first workings and it is easily broken in the pillar extraction; and by having a roof condition of this kind it gives a maximum amount of recovery.

When the pillar line has crossed the entire 25 rooms, there are 25 working places. In addition to the 25 working places along the pillar line there are from 10 to 12 rooms being driven. This gives us as many working places as the motorman can handle; in fact, three working places on the pillars are given to two men. By doing this a good pillar line is maintained, as well as giving the loaders the advantage of loading the maximum tonnage. I certainly believe, regardless of economies, that if a mine is started and planned to remove pillars, the greatest percentage of recovery must be obtained. If this is not done "squeezes" or "rides" are going to follow and this in turn means loss of coal, and in many cases ruination to the mines. In some few instances where economy of coal recovery can not be obtained other methods of mining are reverted to which will give a fair percentage of recovery in removing the coal.

Nothing less than 6-inch timbers are used in all of the timbering on the pillar line, and cap pieces 3 by 6 inches 15 inches long, these being placed parallel with the breaker line. This gives good control over the roof, and if a fall does not come, by use of a post puller you can not only reclaim a great amount of the timbers but secure a fall in practically every incident. Two lines of breaker timbers are set on 4-foot cen-

ters, and these timbers are staggered. In the solid rooms two lines of timbers are set when driving first workings. These are kept on an average of 6-foot centers on both sides of the track. Safety posts are always kept in front of the car so as to insure maximum protection to the loader. Large reports as if a large quantity of explosives were being detonated come at various intervals throughout the day along the pillar line which are known locally as "bumps." The cause of these reports is due to the main overlying strata breaking and only occur when the main strata is broken. In several cases the strata is broken to the surface. When these reports occur it brings with it a great amount of pressure which falls along the entire pillar line, and because of this pressure a large quantity of coal falls from the pillars and stumps. The haulageways must be cleared in many instances after one of these bumps. Pillaring on a "V"-shaped line has been tried, however, with no great deal of satisfaction and success because of the pressure that comes at the "V" point, making mining very difficult and hazardous. The "V"-shaped line was abandoned in preference to the 45-degree line.

The company regulations demand the utmost supervision, and this must be had in order to maintain good pillars and to recover the maximum percentage of coal on the pillar work. A section foreman is in direct charge of the pillar line, and he makes the entire working faces, including the solid work, at least three times daily. In addition to the section foreman, a superintendent, mine foreman, and company inspector visit the pillar sections at least once or twice every week. Their duty is to see that the line is kept in order and the loaders have their timbers set properly and that everything in general is working according to the scheme that the company has mapped out. In addition to these men as supervisors, a shot fireman is used, to whom much authority is given, and two of these are used along the pillar line. This allots to each of these men 12 to 15 miners who come directly under their supervision. Very little shooting is done, however, due to the weight that is secured along the pillar line, and most all of the coal comes down with the use of a pick. A machine is used to cut all of the pockets, with the exception of the wings and stumps, and the weight that comes upon the pillar gives enough leverage on the kerf, which is from 4 to 5 inches, to necessitate but little additional work with pick for all of the coal to come down in large lumps without shooting. The last, and a very important item, on the subject of roof control in pillar extraction is the safety with which it is done. I want to mention that no axes are allowed in the mines, as every

miner is required to have a saw and hammer. The cap pieces and wedges and timbers are all furnished by the company. Timbers in the solid working places must be kept up to the face, and in the pockets of the pillar extraction timbers must be set on both sides of the car so as to give the miner maximum protection. While driving this pocket the breaker line timbers must all be set. The sounding of the room at all times is done by the miner when any foreman enters the working place. This is to assure the foreman that the miner knows his condition and to let the foreman know that he is not working in an unsafe condition, and if these general rules are carried out you can receive the maximum safety in pillar extraction.

## Recent Developments Concerning International Double Taxation

(Continued from page 16)

none of these methods are applicable, can the tax authorities resort to fractional or other methods.

There are some special provisions in the convention with respect only to banks and financial enterprises. There are no special provisions as to mining companies. Under this treaty, in the case of a mine operated in a foreign country, if the books of the mine are properly kept and show fair or market prices for purchases made and ore delivered, the taxing authority is bound to accept the statement of income shown by those books, without regard to other operations of the company elsewhere.

The next and the final step in this progress of many years' devotion toward a solution of this problem will be to accomplish the actual negotiation and adherence to this convention by the various governments. That is a matter of diplomatic and political action. In foreign countries the national sections of the International Chamber of Commerce are working to this end. The American Section will doubtless shortly present the matter to the executive branch of our Government and suggest favorable and immediate action. It may take some time to accomplish it.

We believe this is a good treaty. We believe it embodies principles considered just and sound by American business men. We believe it to be the best interest of American business and of all business in other countries, that the United States Government should negotiate and sign the treaty jointly with as many nations as possible. We believe it also in the best interest of the United States Government as well as of all just governments, as a great step forward in the ability to collect taxes not less and not more than should properly be collected, and with increased ease of correct ascertainment and collection.

# Has Mechanized Mining Brought Safer Coal Mining

By LYMAN FEARN \*

**T**HE INSTALLATION of mechanical-loading equipment was commenced in the State of Wyoming during the year 1916. This was in the type of Thew loaders installed in the Hanna Mine No. 4 of the Union Pacific Coal Company. These loaders were in operation from 1916 until July, 1930, loading approximately 1,250,000 tons of coal during that period. One fatality and very few injuries occurred which were chargeable to the loading of coal.

In 1923 additional progress was made in the installation of mechanical equipment, but it was not until the year 1927 that the hand loaded and mechanically loaded tonnages were segregated in the annual report of the state inspector of coal mines.

Today we have a number of different types and systems of loading coal mechanically. During 1932, 67 percent of the coal production of the state was loaded mechanically.

The primary purpose of the installation of mechanical loading is to bring about a reduction in the cost of producing coal. If by loading coal mechanically the hazards are increased and injuries and fatalities are more frequent, it would be very evident that the purpose of these installations has been defeated, as any reduction in the cost of coal, if brought about at the expense of human life, is not justified. It is an admitted fact that the loading of coal mechanically has brought about greater hazards in some respects than were suffered under hand-loading methods. I shall enumerate some of these briefly:

Constant maintenance of power at the working faces with the ever-present danger of gas ignitions and electrocutions caused by men coming in contact with high-voltage wires and the ignition of gas from arcs. This danger was quickly recognized by the operating officials and miners, and rules were formulated for the installation of electrical equipment and the detection of any accumulations of methane that might be present. All electrical installations should be installed

in workmanlike manner, and in gaseous mines be of permissible type. There should be a certified mine official present, and examination made for methane before the power is turned on the machine and at frequent intervals during the cutting or loading operation. If these rules are complied with it is reasonably safe to operate electrical equipment in a gaseous mine.

In order to operate loading machines efficiently, it is necessary that the state laws be so framed as to allow shooting during the working shift. This is considered by a number of leading safety men to be criminal practice, and it has been given considerable thought by the mining fraternity of this state. A system has been worked out whereby the operator designates a shot-firer and the state inspector of coal mines examines each one designated, orally, the qualifications to be that he is a practical miner, a citizen of the United States or has used due diligence to become a citizen, and he is to have a thorough knowledge of the detection of mining gases with an approved type safety lamp. This plan of shooting has been in effect since June, 1929, and to date we have not experienced any gas ignitions or injuries from blasting operations.

The constant movement of any type of mechanical loader causes more or less friction against the coal and creates an additional amount of coal dust, which is a constant hazard. In order to combat this hazard, better and more efficient sprinkling systems have been installed to each working face, and rules applied making it mandatory to sprinkle each working face before blasting operations. Water is also used on the cutter bar to a great extent, and rock dusting is carried on up close to the advancing faces. These extra precautions have overcome any additional hazard which may have been created by the installation of loading equipment.

The constant cry of mine officials for speed in production is a factor against safety. Many mine officials, after the installation of mechanical loading equip-

ment, expect too much from this loading equipment, and in many cases disregard safety practices in order to complete a certain number of cycles of operations during the working shift. When the management realizes that safety is a greater factor in the reduction in cost and that it is the duty of the foreman to act as a trainer and teacher along safety lines, and that his success as a foreman depends more on his ability to operate safely than on his ability to produce coal at low costs, we shall see an improvement along the lines of safety and there will be less cry for speed in production.

As the loading of coal mechanically has some disadvantages as to greater hazards than loading coal by hand methods, it also has some advantages. I shall enumerate some of the advantages briefly:

Wherever mechanical loading has been installed it has brought about a reduction in man power in that operation. This has given the mine management the advantage of being able to select its men. The greatest factor of safety in mining, in my opinion, is a safe workman, and where the management has been able to select safe workmen the installation of mechanical loading has brought about a reduction in mine accidents. The mine foreman who has the faculty of selecting capable and safe workmen has invariably shown a reduction in mine accidents.

The matter of concentration of the working area is a big factor in the safe operation of any coal mine. The installation of mechanical loading has brought about concentration. Greater supervision has also been brought about through the concentration of working places. In order to show to some extent just what this concentration of working places means, I have taken the areas to which men are exposed during the working shift in the mining and transporting of coal to the main haulage systems in two of the mines working in this state, one working under mechanical means and one working under hand mining means.

\* State Coal Inspector, Rock Springs, Wyo.

These mines are adjacent and the physical characteristics are the same. The one under mechanical means we shall designate as Mine "A," and the one working under hand methods as Mine "B."

From the following tabulations it can be readily seen that in the hand-loading mine we have a ratio of three to one in area for maintenance costs and exposure to roof, which is a factor that can not be overlooked in the safety of mining.

From the records of this department I have tabulated the fatalities which have occurred during the past six years. These fatalities have been tabulated and charged to places working under hand-loading and mechanical-loading methods. In the matter of haulage accidents, sur-

face accidents and construction accidents they remain the same for both types of loading. During the past six years 16,573,494 tons of coal have been mined and loaded mechanically, and 21 fatal accidents occurred in and around the working faces, which shows that 789,214 tons of coal were mined per fatal accident at the face. During the same period 18,657,572 tons of coal were mined by hand-loading methods and 63 fatalities occurred in and around the working face, making 296,152— tons of coal mined per fatal accident. This shows that 493,067 more tons of coal per fatal accident were mined by mechanical means than were mined and loaded by hand-loading methods.

While some of the mines which are

loading coal by hand methods are old operations and greater hazards do exist in them than exist in the newer operations which are mechanically equipped, it is my opinion that mechanical loading has and will continue to bring about safer and better mining operations in the coal industry of the United States.

## The National Clay Mining Industry

(Continued from page 12)

I am sure that our industry welcomes the opportunity which NRA gives it to improve conditions, and is most anxious to cooperate with the Government officials in every helpful way.

While it is fully realized that wages are entirely too low throughout the industry, and in some sections, to the point that it is impossible for employees to earn a decent living, nevertheless, it is not possible to correct this situation without some outside help toward getting together an organization sufficiently strong to stop unfair competition, and to secure prices for our products that will enable us to pay fair wages, and otherwise improve conditions in the industry.

The mining of clay being one of our natural resources, and in many cases, of more or less limited extent in the deposits, the matter of depletion of the properties sometimes places a heavy burden on the producer at a time when his ore-body is completely exhausted, thus adding greatly to costs of production. The replacement of wornout and obsolete machinery and equipment is also an item of expense of large proportions. To these factors can be added many other items which go to make up costs of production, and in many cases clays are sold at prices so low that no consideration whatever is given the matters of depletion, depreciation, etc., with the result that the waste is tremendous, and failures frequent, causing hardship on employer, employee, and public alike.

Many operating companies have already effected wage increases, reduced hours, and otherwise taken steps to improve conditions in the industry, but rapid progress in this direction can not be expected until there is a stronger organization; therefore, the American Clay Association, and its officers wish to make a strong appeal to every firm in the country in the business of producing and selling any type or kind of raw material classified as a clay, to join us in our efforts to so organize the industry, that complete cooperation with the National Recovery Administration can be made effective at the earliest possible moment.

It would seem to us in the clay mining industry that our Government should give special consideration to our problems, and we stand ready, in turn, to cooperate to the limit of our ability toward helping to bring about the practice of fair competition, payment of living wages, and in every way to do our part toward making the National Industrial Recovery Act a complete success.

### APPROXIMATE AREA, IN SQUARE FEET, IN WHICH MEN ARE EXPOSED TO ACCIDENTS

MINE "A"			
No. of Entry	No. of Places	Area in sq. ft.	No. of Men
2	3 Eicks, 2 rooms, 1 stump	13,500	9
7	5 Northernns	7,500	11
9	5 "	7,500	11
11	5 "	7,500	11
12	5 "	7,500	11
13	2 Eicks.	3,000	8
15	1 Shovel, 1 Eick.	18,700	13
16 (shovel)	1 " 1 "	17,500	10
16 (inside)	2 Eicks.	4,000	8
17	1 Shovel, 1 Eick.	17,500	11
18	3 Eicks.	6,750	9
19	3 "	6,750	9
Totals		117,700	121
Area in sq. ft. per employee		972.72	

MINE "B"			
No. of Entry	No. of Places	Area in sq. ft.	No. of Men
1 South	10	9,000	18
1 Panel, 1 South	30	212,500	28
4 South	Not working		
5 South	14	70,000	18
6 South	Not working		
9 Entry	4 Places, entry stumps	6,000	7
10 Entry	2 " "	3,000	4
11 Entry	7	30,500	15
New Slope	6	3,000	6
Totals		334,000	96
Area in sq. ft. per employee		3,479.16	

### FATAL ACCIDENTS

Year	Mechanical Loading	Hand Loading	Haulage	Surface	Construction	Total
1927	4	13	4	1		22
1928	5	17	3			25
1929	4	9	8			21
1930	3	16	3	1		23
1931	4	5	4		1	14
1932	1	3	1	1		6
Totals	21	63	23	3	1	111

### PRODUCTION

	Mechanical Loading	Hand Loading	Total
1927	2,013,449	4,725,112	6,738,561
1928	2,811,588	3,741,586	6,553,174
1929	3,255,405	3,444,374	6,699,779
1930	2,954,866	3,115,903	6,070,769
1931	2,798,319	2,202,046	5,000,365
1932	2,739,867	1,428,551	4,168,418
Totals	16,573,494	18,657,572	35,231,066



# MINING EVENTS

**C**OPPER and anthracite are the two major groups in the mining field which are still in the process of developing Codes of Fair Competition—not that other branches of the industry have settled their difficulties; they have not. Bituminous operators have been at an impasse in arriving at some plan to enforce their agreed code; Lead and Zinc, Sand and Gravel, and the smaller units are deeply involved in working out code problems. Iron and steel appear to have less difficulty than other groups, and statements emanating from the Iron and Steel Institute indicate a high degree of successful cooperation, with the outlook for 1934 very encouraging. Increasing attention is being given to the problems of price fixing. This subject is the stumbling block of many industries, notably bituminous and copper.

While favoring loss limitation provisions in codes, General Johnson expressed his opposition during the week to price-fixing and regarded the basing point system of price posting as "subject to suspicion." Nevertheless, minimum price provisions are being asked (it is expected that the copper code will provide a better return than at present) and there are many who feel that such provisions will be needed pending the very gradual restoration of normal operations which now is generally accepted as the most one can depend upon, in view of the near completion of CWA work and its consequent re-unemployment and the apparent failure (as yet) of devaluation to raise prices.

Special provision for the protection of small businesses or units of industries and consumers, allegedly oppressed by the operation of larger groups under a code, is made in the "Manual for the Adjustment of Complaints" just distributed by the National Recovery Administration to state directors and code authorities.

The manual—the Administration's Bulletin number 7—detailing the procedure to be followed by complainants in filing, and by state directors and by industrial adjustment agencies—code authorities,—in handling complaints provides:

"Even where an industrial adjustment agency has been authorized to handle complaints, a complainant always has the right to file his complaint with NRA either in Washington or through a state director in order to protect his or the public interest."

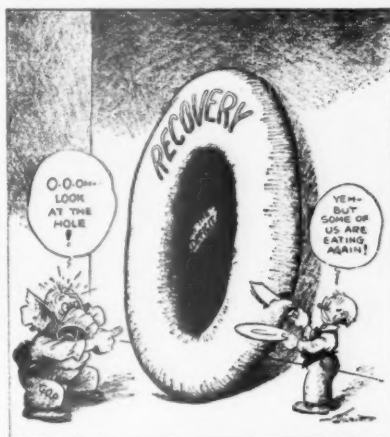
Additional safeguards are found in a regulation requiring that state directors refer complaints to the proper code authority unless "the complainant indicates that he purposely filed a complaint with the state director or that fact appears from the substance of the complaint, e.g. a complaint that the code authority is dominated by hostile or monopolistic interests. . . ."

Again the manual emphasizes that a complainant always has the right of appeal from a code authority decision to some higher adjustment agency, or to the state director, or the recovery administration itself.

"Whenever," it is pointed out, "an industry is attempting to adjust a complaint through its own industrial adjustment agency, it should be made clear to any complainant or respondent that if he is dissatisfied he has the right to appear in person before the adjustment agency or to file a statement with that agency and, if still dissatisfied, to take the case up to a higher adjustment agency or with the state director or NRA in Washington."

The manual points out that there are two aspects of code administration. One is planning and progress and the other

**AFTER ALL—THERE'S TWO WAYS OF LOOKING AT A DOUGHNUT!**



—Washington Daily News

is compliance. The first being chiefly a function of industry itself the manual is principally devoted to the subject of compliance which, while also a function of industry, is calculated to require for efficient code administration, the cooperation and assistance of NRA. Particularly in the adjustment of complaints of alleged violation of labor provision of codes, the manual recognizes the necessity for the most comprehensive organization of regional adjustment agencies. To that end it has set up agencies to aid in inducing compliance and the manual outlines in detail the methods of procedure.

In preparing the regulations for handling of complaints the administration realized that operation under codes is new to industry and trade and that a large proportion of the complaints filed will be the result of misunderstanding rather than deliberate violations.

With this in mind the regulations provide for progressive steps to obtain adjustment of the complaints and pledges of future compliance in cases where such settlements appear possible. In cases, however, where it is evident that the employer complained of has no intention of complying with his code because he thinks the code cannot or will not be enforced, the regulations offer a shortcut to the federal trade commission, or the department of justice for prosecution.

The machinery of obtaining compliance, except in unusual cases which will require enforcement by legal process invoked either by the federal trade commission or the department of justice, is established through various types of industrial adjustment agencies. These may be either the code authority of an industry or a complaints committee set up by the code authority which will in turn establish within the industry, adjustment agencies, either divisional or regional, and in addition the compliance agencies of the government. These comprise 48 state directors, with three offices in the State of New York, two for Pennsylvania and two for Texas—under the national emergency council.

## Bituminous

**C**OAL developments during the month centered at the NRA and the National Labor Board. The question of the captive mines has been settled temporarily at least as far as the labor board is concerned. Two hearings were held on these cases following the elections at the captive mines which the board supervised. The decision handed down by the board dealt with the mines controlled by the United States Steel Corporation but since the circumstances were the same in the other captive mines the ruling applied in both cases. The board ruled on the check-off and the conflict regarding contractual parties but naturally could not pass upon its jurisdiction to arbitrate which is the principal point at issue as was shown at the hearings. It appears, therefore, that the courts must decide the status of the board and consequently its power to arbitrate.

The National Bituminous Coal Labor Board and the N.B.C. Industrial Board each held meetings, the former taking up the matter of handling wage disputes and the problem of "snowbirds," while the latter took action to provide more effective enforcement of the bituminous code. A plan of enforcement was drawn and turned over to the NRA legal staff for study.

The National Bituminous Coal Industrial Board has submitted to Division Administrator K. M. Simpson a tentative draft of plans for more effective enforcement of the bituminous coal code.

The plan was prepared by the board's committee on "definite form of enforcement"—one of five committees named Tuesday. The other committee,—on adjustment of inter-divisional matters, increase of production and opening of new mines, creation of an industry planning board and adoption of a basis for price relations,—was expected to report its recommendations January 19.

The enforcement plan, the details of which have not been made public, was drawn, after a conference with Assistant Compliance Director Frank Healy by F. V. H. Collins, president of Bair-Collins Company, Roundup, Montana; E. M. Douthat, general manager of the Majestic Mining Company, Kansas City, Mo.; and Jonas Waffle, secretary of the Indiana Coal Trade Bureau, Terre Haute, Indiana.

It was transmitted by Division Administrator Simpson to the administration's legal staff for study which, in turn, will submit the report with recommendations to National Recovery Administrator Hugh S. Johnson.

The five committees were appointed Tuesday after Mr. Simpson, Donald R. Richberg, the administration's general counsel and John L. Lewis, president of the United Mine Workers of America and one of President Roosevelt's appointees to the industrial board, warned the board the industry faces the test of its ability to govern itself.

It was pointed out that the industry's chief problem is the establishment and maintenance of an agreed price structure which is not only fair to the consuming public but adequate to support the wage scales.

"I am very frank in saying" asserted Mr. Richberg to the board, "that I think the National Recovery Administration may have its share of responsibilities for difficulties in beginning the administration of the code. We may be subject to some criticism for acts of omission or commission, but I think that the operators of the coal industry must accept the fundamental responsibility of putting their own house in order. That is the opportunity which it has been sought to give them in the code.

"This code has been very largely written by the industry. Despite the long and tedious effort in arriving at a code, you who are here are well aware of the fact that 90 percent of the difficulties arose out of the opposing views of the industry, and not out of the difficulty in meeting the views of the administration.

"It is not this organization, but the conflict within the industry which presents the problems and the code has been adopted in the hope of solving them. In the main, the methods which have been adopted have been those which, so far as possible, it seems that the industry might be able to agree upon. So I think we have a right without attempting to do any lecturing or pass any criticism, to simply point out the very simple fact that an acknowledgment of failure at the present time by the industry to achieve important conditions under the code, will be an acknowledgment of the incapacity of the industry to govern itself, and it is not the appropriate time to discuss an amendment to the code and put in a lot of additional powers, when the powers already present in the code have not been properly exercised."

"I think," declared Mr. Richberg, "you are at a very serious crisis in the affairs of the bituminous coal industry, because you have your code and you have your opportunity, and if the opportunity is not taken advantage of so that we simply have to degenerate back into a disorderly, lawless, anti-social industry, in which everybody tries to cut everybody's throat, and have everything from economic to actual civil warfare develop in the industry, I want to give a prophecy. I know a little about something on capitol hill and about that time the government of the United States will feel it is about time to exercise some real control over an industry that is so incompetently handled."

"I have been loath," said Mr. Lewis, "to think that the industry could not govern itself. I still think it can, I think, however, that we will have to accept the experience of the few months and profit from that experience to the degree of

## ANNOUNCEMENT

**Official announcement has just been made by the American Mining Congress of the acceptance of Mr. C. M. Lingle, vice president, Buckeye Coal Company, Nemacolin, Pa., as the national chairman for the Eleventh Annual Convention of Practical Coal Operating Men to be held at Cincinnati, Ohio, May 7-11, inclusive.**

**The American Mining Congress also announces that plans for the exposition, to be held in conjunction with this convention, are going along rapidly. Members of its Manufacturers Section have in a 10-day period contracted for more than 40 percent of the total available space. Mr. John T. Ryan, vice president and general manager of the Mine Safety Appliances Company, Pittsburgh, is chairman of the Manufacturers Section.**

**The convention and exposition will, as usual, be held under the sponsorship of the Coal Division of The American Mining Congress, of which Mr. R. L. Ireland, Jr., vice president of the M. A. Hanna Coal Company, is national chairman.**

doing some other things that are necessary in the industry.

"I think it is obvious this board will have to assume a large share of the governing of the industry. Obviously there must be a greater degree of coordination between the subdivision and division code authorities, and certainly there must be some central supervising agency that is able, in some form, to devise means whereby questions of dispute as between division authorities can be adjusted. Permanent facilities must be provided in the industry. The obligation of providing ways and means to do that thing under the code rests with these leaders of the industry who have accepted membership.

"I am profoundly concerned," continued Mr. Lewis, "because the interest I represent is tremendously and vitally affected—with the question of whether or not you can maintain the price structure of the industry. . . .

"If it is true that the price structure of the industry, and the machinery for its maintenance, is the foundation of the wage scale, then it becomes inevitably true that when you destroy that foundation you are jeopardizing and breaching the wage contract."

The membership of the other four committees and their assignments is as follows:

### Adjustment of Inter-Divisional:

Wayne P. Ellis, presidential member, code authority, division I, Washington;

Joseph Harrington, presidential member, code authority, division II, Chicago; A. A. Liggett, president Raleigh Smokeless Coal Company, Cincinnati, O.

### Increase of Production and Opening of New Mines:

John L. Lewis, J. D. A. Morrow, president, Pittsburgh Coal Company, Pittsburgh, Penn.; Robert S. Lemon, presidential member, code authority, division IV, Kansas City, Mo.

### Creation of an Industry Planning Board:

Charles O'Neill, vice-president, Peale Peacock & Kerr, Incorporated, New York City; Herbert S. Salmon, presidential member, code authority, division III, Birmingham, Ala.

### Basis for Price Relations:

J. D. Francis, vice-president, Island Creek Coal Company, Huntingdon, W. Va.; D. W. Buchanan, alternate for George W. Reed, vice-president, Peabody Coal Company, Chicago, Ill.; Henry DeBardeleben, Birmingham, Ala.; Arthur Vail, presidential member, code authority, division V, Rock Springs, Wyo.

## CAPTIVE MINE DECISION

The National Labor Board's decision in the captive mine cases states at the outset that the operators agreed to negotiate a contract with whatever representatives the workers would choose for collective bargaining. The agreement reached with President Roosevelt also provided that "if no agreement with the majority representatives is reached in 10 days the controversy will be immediately submitted by both parties to the National Labor Board for decision and both parties will agree to abide by the decision."

Following the elections at which the representatives were chosen by the workers, negotiations for an agreement were begun by the operators but no agreement was reached within the 10-day limit specified and the board therefore summoned the parties involved to a hearing which was held January 4. At the hearing, the decision states, "it developed that the operators and the United Mine Workers were in substantial agreement as to the contract with two exceptions, viz: (1) the proper parties thereto and (2) the check-off provision. The present controversy revolves about these two points of difference."

Regarding the contention of the operators at the hearing that the board has no jurisdiction to pass upon the question of the proper parties to the contract and that the "controversy" in the presidential agreement was contemplated as relating only to wages, hours and conditions of employment, the decision states: "Our view of this matter . . . renders it unnecessary to pass upon this contention or to examine the intricate reasoning which is claimed to support it."

The decision then examines the merits of the conflicting theories of the operators of the U.M.W. concerning the parties to the contract illustrating the differences by reproducing the exact language proposed by each in a typical contract. The operators' proposed contract listed each of the representatives chosen by the workers as the party of the second part while the U.M.W. proposed contract named "District No. 4, United Mine Workers of America, on behalf of itself and each of its members" as party of the second part. "It is apparent," the board stated, "that the



United Mine Workers of America, as such, and that the operator demands that the contract be between it and the elected representatives." Recalling the presidential agreement upon this phase of the matter, the board declares that "it is clear that the contract contemplated . . . is to be made with the elected representatives and that such representatives may be officers of the U.M.W. of A. . . . The operators recognize these facts but . . . fail to give full effect to them."

The board then ruled that the formal clauses of the contract should list the representatives elected by the miners as the party of the second part as "representing the employees of the aforesaid coal company, who lected them as their representatives, and such other employees, as may authorize them to represent them in negotiations with their employers." Whether this language legally amounts to a recognition of the union, the decision states, "is a question not before us and which need not here be decided."

Regarding the check-off, the board ruled that the language proposed by the U.M.W. is the proper one to be employed in the contract but "to forestall any future misunderstanding" it added a proviso guaranteeing the right of non-union workers "to make voluntary assignments of his wages for dues or payments to any organization of which he may be a member, or for any other purpose."

The board granted 15 days for final agreement.

#### RETAILERS CODE

The code for the retail coal business, affecting a sales volume of more than \$1,000,000,000 and, directly or indirectly, reaching a large part of the people, has been completed by NRA deputies and is ready for transmittal to General Hugh S. Johnson, administrator, and thereafter to the President for approval.

This code covering the Retail Solid Fuel Industry, the result of long study, conferences and public hearings is expected to increase employment and wages and, by a minimum market price set-up, both benefit the industry and protect the public.

Price advances to the consumer may be expected, it was stated, as they are essential to increased wages. But a careful system of checks and balances is established. Prices shall be posted publicly. Furthermore, divisional boards are created to review all proposed minimum market prices and receive complaints. These supervisions, and the severe competition of oil and gas will prevent any unwarranted increase in the price of coal, in the opinion of experts concerned with the code.

Maximum work hours range from 36 to 48 hours, varying with seasonal requirements and nature of work, and are based upon an eight hour day. Minimum wages range from a low of 25-cents per hour in the south to a high of 50-cents in certain metropolitan trade areas, including New York, Boston and Chicago. The hour provisions are expected to add 31,500 employees to payrolls, increasing the industry's employment 10 percent over the 1933 level and thereby approximating the 1929 level, which was 346,500. Prior to the President's Reemployment Agreement this had dropped to 315,000. It is estimated that payrolls will increase 20 percent under the code.

The national Bituminous Coal Labor Board has decided that where there is an

#### LOOKS LIKE IT'S GOING TO BE MORE OR LESS OF A SOLO



—Washington Daily News

agreement between operators and employees providing a definite method of handling wage disputes, the board would not take jurisdiction. The question of contracts made before the effective date of the code or of the NIRA also was discussed, and it was decided that the board will take jurisdiction under these contracts where there was no method provided for arbitration.

#### PRODUCTION

Bituminous production during the week ending January 20 totaled 7,230,000 tons as compared to 7,380,000 tons in the previous week and 6,413,000 tons in the corresponding week of 1933.

President Roosevelt has appointed John L. Lewis, president of the United Mine Workers of America, and F. E. Berquist, coal expert formerly in the Bureau of Mines and now attached to the recovery administration's research and planning division, to be members of the National Bituminous Coal Industrial Board.

In addition to General Johnson, Messrs. Lewis and Berquist and nine operators representing the industry, the board includes the presidential members of the five divisional code authorities as follows: Wayne Ellis, of Washington, D. C., division I; Joseph Harrington, of Chicago, Ill., division II; Herbert S. Salmon, Birmingham, Ala., division III; Robert S. Lemon, Kansas City, Mo., division IV; and Arthur Vail, Denver, Colo., division V.

Figures on Illinois Coal Production for all Shipping Mines for the year 1933, have just been released by the Illinois Coal Operators Association, and are as follows:

Year	Total Production All Shipping Mines	Total Production All Local Mines	Total
1933.....	35,179,770 tons	.....	.....
1932.....	31,452,288 tons	2,718,387 tons	34,170,675 tons
1931.....	43,003,511 tons	2,079,365 tons	45,082,876 tons

NOTE: The 1933 production figures for local mines will not be available until the publication of the year book about June 1st, but it is estimated this tonnage will be 2,600,000 tons.

	Total State Shaft Production Shipping Mines	Total State Strip Production Shipping Mines	Total State All Production Shipping Mines
1933.....	29,777,260 (84.6%)	5,402,510 (15.4%)	35,179,770 (100%)
1932.....	25,041,434 (79.6%)	6,410,854 (20.4%)	31,452,288 (100%)
1931.....	36,719,036 (85.4%)	6,284,475 (14.6%)	43,003,511 (100%)

#### BITUMINOUS INDUSTRIAL BOARD ADOPTS RESOLUTIONS

The National Bituminous Coal Industrial Board on January 22, adjourned its sessions with the National Recovery Administration, subject to the call of the administrator.

The conferences, presided over by Division Administrator Kenneth M. Simpson and Deputy Administrator Wayne Ellis, resulted in the adoption of important resolutions proposed by the industry, as follows:

1. The committee on industrial planning adopted a resolution approving proposed legislation framed in a bill by Representative R. E. Thomason of Texas, calling for a Congressional appropriation to permit government departments having coal contracts to adjust prices to take care of the increased cost due to operation of the bituminous coal code. The only provision of this nature in the government contracts is for wage increases. The Thomason bill covers all necessary advances in price due to the operations of codes.

2. A resolution was adopted giving it as the sense of the industry that "grave injury" resulted from the practice of the government, acting through the PWA and other agencies, in loaning money directly for the construction of hydroelectric developments "without full consideration of the effects on this and other industries."

3. General satisfaction of the bituminous coal industry with its code led to a motion which would bring about the automatic extension of the code beyond the present limit of April 1, 1934.

4. F. V. H. Collins, chairman of division number 5, at Denver, Colo., suggested a method whereby code authorities may handle complaints. This is a matter of enforcement and it was proposed that hearing be held on complaints to the code authorities and decision be handed down by them. In case of contained non-compliance the case will be turned over for action of the deputy administrator in Washington. The case may then be referred to either the compliance board or the department of justice.

5. Resolutions were adopted making refusal by operators to furnish reports or to pay the expenses of the code authority a violation of the code. Such violations would be handled in the same manner as other infringements of the code.



## Anthracite

**T**HE CONCESSIONS made by the anthracite operators in the draft of a new code submitted to NRA apparently are still unsatisfactory to Deputy Davis.

General Johnson, when asked about it, said the Administration may have to write a code for the industry. In view of the suggestions made by Deputy Davis to the operators it appeared that the new provisions offered would be acceptable as a compromise. These provisions included a 40-hour week with continuance of wage rates prevailing under the existing contract with the United Mine Workers, the establishment of a board to study ways of reducing the cost of coal to the consumer and the creation of a commission to alleviate unemployment of miners. Obviously, the code negotiations have taken on the aspects of a bargaining affair, one side asking more than it expects in order to gain what it wants, while the other side offers less than it knows it must give in order to give what it can. There are indications, however, that both sides will soon reach a common ground and that a code will not have to be written for them. Deputies Davis and Ward have been conferring with Federal mining officials on proposal in the revised code and submission of price control terms to Mr. Davis is expected momentarily.

In the meantime, the National Labor Board is proceeding with its investigation of conditions in the anthracite area. Conferences were held during the week with members of the Anthracite Conciliation Board, which is to act for the NLB in the inquiry, and it has been announced that hearings of labor grievances will begin at once in Hazleton, Pa. The strike in the Scranton and Wilkes-Barre districts appears to be rapidly losing strength but the unrest is still great and reports of violence are more frequent. Production of anthracite during the first week of the strike was considerably greater than in the corresponding week of 1933, but not as large as in the week preceding the strike when operations apparently were stepped up as a result of increased purchases as protection against the possibility of reduced supplies. It appears, however, that a much greater curtailment of production was expected than that which actually occurred for in the week immediately prior to the strike output totaled 1,683,000 tons, the highest figure in many months. During the next week production, despite the strike, was 1,322,000 tons, which was considerably higher than the average weekly production in December.

Senator Robert F. Wagner has announced that the National Labor Board has transmitted to the Anthracite Board of conciliation documentary complaints of grievances, together with instructions concerning the immediate inception of the government's investigation of anthracite matters.

The Anthracite Board of Conciliation, under the chairmanship of its umpire, had been appointed by the National Labor Board to carry out the investigation recommended in the board's decision of January 12. The documentary evidence turned over to the Anthracite Board had been received by the Labor Board direct, or had been collected by the Fact-Finding Committee it had sent into the Wilkes-Barre-Scranton district.

C. H. Golden, secretary, and William W. Inglis, of the Anthracite Board of

Conciliation, conferred today with the National Labor Board in regard to the investigation. After the conference the Anthracite Board issued the following notice of instructions:

"The Board of Conciliation having been delegated as an agency of the National Labor Board, and in compliance with the instructions of the said National Labor Board, the Board of Conciliation now instructs any employee in No. 1 district having a complaint against the company employing him or against the labor organization of which he is a member, to immediately file, in writing, his complaint and mail or deliver the same at once to the secretary of the Board of Conciliation in Hazleton, Pa. Investigations and hearings, with an impartial head, will start as soon as sufficient number of complaints have been received. Anthracite Board of Conciliation."

Deputy Administrator William H. Davis has revealed details of the six suggestions he offered representatives of anthracite mine operators and the United Mine Workers of America in conferences during the week in an effort to expedite approval of a code of fair competition for the anthracite industry.

Mr. Davis pointed out that, as submitted by the industry, the proposed code merely recognizes the existing agreement between the operators and the United Mine Workers. The union leaders have insisted upon provisions in the code reducing the work week fixed in the agreement from 48 hours to 30, and increasing the wage scales proportionately, although the average number of hours worked by those now employed in the industry is only 25 a week.

Mr. Davis summarized his suggestions as follows:

1. The code should provide in some form, other than by mere reference to the existing agreement, for minimum wages and maximum hours. The deputy's suggestion as to the maximum hours is eight hours per day with an overtime penalty for all time worked over eight hours per day.

2. It is suggested that there should be created for the industry under the code a board having equal representation of management and workers whose duty it will be to proceed at once to the registration of all qualified mine workers, and whose duty it shall then become to study and make recommendations with regard to methods of equalizing the work.

3. It is suggested that either this committee or another special committee study forthwith plans for making available to the industry in an effective way such aid as may be obtainable from the Civil Works Administration.

4. The deputy expressed his own opinion that the conditions in the anthracite industry are such as to prohibit the in-

crease of costs of producing anthracite and getting it to the consumer, and suggested the appointment of a board that would endeavor to bring together all interests and to work out a plan to which everyone interested would contribute and by which the cost of producing anthracite and getting it to the consumer might be reduced.

5. The deputy announced that there had already been called together in the NRA, under his chairmanship, a tentative committee for the purpose of canvassing the possibility of setting up a fuel and energy planning board whose duty it would be to consider problems that cut across two or more of the energy industries.

6. With respect to the check-off it was the deputy's opinion that the code could well be prepared either with or without provisions for check-off, depending upon agreement in the industry; but it was made clear that any check-off provisions in the code would be applicable only to those mine workers who should express their desire to have the union dues checked off from their wages, and that provisions so put into the code would be one of the things which the compliance division of the NRA would be expected to enforce. It was the deputy's personal opinion that a check-off provision is much more appropriate to be included in an agreement between the mine workers and the management than in the code.

Mr. Davis also disclosed he had expressed the hope that the conferees would remain in Washington until a code has been agreed, and added he expects a report from them shortly.

The operators were represented in the conference by E. W. Parker, H. J. Connelly, Charles Dorrance, H. J. Harley, W. W. Inglis, J. B. Warriner, T. R. Close, James Prendergast, W. H. Suender, F. W. Leamy, C. F. Huber, W. G. Merritt, and A. B. Jessup.

The United Mine Workers were represented by Thomas Kennedy, M. F. Brennan, John Boylan, M. Hartnealy, and C. J. Golden.

FIGURES received from the Bureau of Foreign and Domestic Commerce by the Anthracite Institute, indicate that imports of anthracite during the month of December, 1933, amounted to 47,853 net tons, as compared with 31,945 during the same period in 1932. The result is that imports for the calendar year 1933 aggregated 456,251 net tons, or 24.9 per cent less than the 607,121 tons total during 1932. During the past year, 91.4 per cent were received in Massachusetts and Rhode Island, as compared with 85 per cent during 1932, indicating a concentration in these two states. Similarly, imports from the United Kingdom and Russia amounted to 94.1 per cent of the total in 1933, as against only 84.6 per cent in the year previous.

The total production of anthracite (which includes colliery fuel) for the week ending January 20, as estimated by the Bureau of Mines, amounted to 1,322,000 net tons. This is a decrease as compared with production of the preceding week, of 361,000 tons; or 21.4 per cent. Production during the corresponding week of 1933 amounted to 1,001,000 tons.

### ESTIMATED PRODUCTION OF ANTHRACITE (Net Tons)

	Week	1934 Daily Average	Week	1933 Daily Average
January 6 .....	1,393,000	278,600	647,000	129,400
January 13 .....	1,683,000	280,500	1,029,000	171,500
January 20 .....	1,322,000	220,300	1,001,000	166,800
Cal. year to Jan 20, 1934. . .	4,398,000	Coal year to Jan. 20, 1934		41,157,000
Corresponding period, 1933.	2,677,000	Corresponding period, 1933.		39,132,000

## Lead and Zinc

ACCORDING to the United States Bureau of Mines, refined lead produced in the United States from domestic ores in 1933 totaled 252,500 tons, a decrease of 1 per cent from the output in 1932 and a new low record production since 1899. Refined primary lead produced from foreign sources amounted to considerably less than one-half of that recovered in the preceding year and was less than in any year since 1886. The recovery of secondary lead at primary plants increased during the year, however, and the total output of refined lead at primary plants was only 3 per cent less than in 1932. The calculated new supply of lead made available for consumption was 9 per cent lower in 1933 than in 1932.

The output of primary domestic desilverized lead in 1933 was about 146,900 tons; of soft lead about 81,900 tons, and of desilverized soft lead about 23,700 tons, making a total output from domestic ores of about 252,500 tons of refined lead. Corresponding figures in 1932 were 156,683 tons of desilverized lead, 63,130 tons of soft lead, and 35,524 tons of desilverized soft lead, making a total of 255,337 tons. The output of lead smelted and refined from foreign ore and bullion was about 13,900 tons, as compared with 33,024 tons in 1932. The total primary lead smelted or refined in the United States in 1933 was thus about 266,400 tons, a decrease of about 8 per cent as compared with the total of 288,361 tons in 1932. Plants that treat primary materials mainly produced 46,300 tons of secondary lead in 1933 compared with 33,611 tons in 1932. Therefore, the total output of primary and secondary refined lead at primary refineries was 312,700 tons, as compared with 321,972 tons in 1932, a decrease of 3 per cent. Antimonial lead produced at primary refineries in 1933 amounted to about 18,000 tons, as compared with 21,024 tons in 1932.

The imports of lead as "pigs, bars and old" for 11 months amounted to 109 tons. The base bullion imported during the same period contained 322 tons of lead. The exports of domestic lead in pigs, bars, etc., during the first 11 months amounted to 22,309 tons and exports of lead sheets during that period were 170 tons. Exports of foreign pig lead for 10 months amounted to 4 tons. Total exports of pig lead for the entire year 1932 were 23,516 tons.

By excluding the stocks of lead at smelters and refineries and by estimating the amount of lead exported with benefit of drawback (for which figures for only nine months are available), the new supply of lead made available for consumption in 1933 is calculated at about 235,000 tons, a decrease of 9 per cent from 257,669 tons in 1932.

The lowest average quoted monthly price for lead at New York (outside market) for the year was 3 cents a pound in January and February, 1933. From that level it rose to 4.50 cents a pound, the highest monthly average, in August and September. The price declined in each of the last three months and closed the year at 4.15 cents a pound. The highest and lowest daily prices of the year were the same as the highest and lowest monthly prices. The daily price of 4.50 cents a pound held from July 10 until October 16, and that of 3 cents a pound began November 18, 1932, and continued until March 8, 1933.

The United States Bureau of Mines announces that primary metallic zinc output from domestic and foreign sources in 1933 was nearly 49 per cent higher than in 1932 and was 5 per cent larger than the output of 1931. Apparent deliveries to domestic consumers were about 58 per cent higher than in 1932. Stocks at smelters and electrolytic refineries were reduced and on November 30 were 23 per cent lower than those on hand at the beginning of the year. Exports of slab, rolled and old zinc for the year will probably be less than one-third of those recorded for 1932 while imports, which amounted to only 349 tons in 1932, may total 2,000 tons or more.

The output of primary metallic zinc from domestic ores in 1933, as reported by producers from figures of actual production for 11 months and estimates for December, were about 307,200 short tons, an increase of 48 per cent over the 207,148 tons produced in 1932.

### ANNOUNCEMENT

**HOWARD I. YOUNG, president of The American Mining Congress, has announced the week of September 24, as the date for the Annual Convention of the Metals Section of this organization. This meeting will be under the sponsorship of the Board of Governors of the Western (Metals) Division, of which Mr. C. F. Dike, manager, Syndicate-Operators Montreal Mine, Joplin, Mo., is national chairman.**

**The meeting will be held in San Francisco, Calif., and an exposition of metal mining equipment and machinery will be held in conjunction with the convention.**

Nearly 800 tons of zinc were produced from foreign ores in 1933. No foreign zinc was reported at domestic plants in 1932 or 1931.

In addition to the output of primary zinc, about 19,300 tons of redistilled secondary zinc was produced, as compared with 14,718 tons in 1932. Thus the total supply of distilled and electrolytic zinc in 1933 was about 327,300 tons, composed of 103,700 tons of high grade, 24,000 tons of intermediate, 66,100 tons of select and brass special, and 133,500 tons of prime western zinc. Of the total output of primary material in 1933, 88,000 tons were electrolytic zinc, of which 80,300 tons were produced in Montana and 7,700 tons in Idaho. Of the primary retort output, 72,700 tons were produced in Pennsylvania, 59,700 tons in Illinois, 43,600 tons in Oklahoma, and the remainder in Arkansas, Texas and West Virginia.

Imports of slab zinc, including a small quantity of scrap and old, amounted to 1,941 tons for the first 11 months. The zinc content of ore imported during the first eleven months of 1933 was 1,945 tons. In the same period exports of slab zinc amounted to 2,751 tons, including 1,642 tons of rolled zinc.

The stock of zinc reported at primary smelters and electrolytic refineries November 30 was about 99,000 tons, a decrease of 23 percent from the 128,192 tons in stock at the beginning of the year. These stocks are 41 percent lower than the record stocks of 167,293 tons on hand at the end of 1930. Stock at plants that produce redistilled zinc bring total stocks of distilled and electrolytic zinc to 101,300 tons. This total is made up of 19,100 tons of high grade and intermediate grade zinc and of 82,200 tons of brass special, selected, and prime western zinc.

Apparent deliveries of primary slab zinc to domestic consumers in 1933 amounted to about 336,000 tons, an increase of 58 percent from the 213,280 tons reported for 1932. Apparent deliveries in 1933 amounted to a little more than 60 percent of the annual average for the period 1925-1929, inclusive.

A total number of about 84,000 regular horizontal retorts was reported at the 15 zinc smelters that operated during all or a part of the year. Of that number, 28,214 retorts, or one-third, were reported in operation at the end of November, and the same number was expected to be in operation at the end of the year. At the end of 1932, 20,613 retorts were reported in operation.

According to trade journals, the average monthly price of prime western zinc at St. Louis was 3.02 cents a pound in January. From this figure the average declined to 2.67 cents a pound in February, the lowest monthly average for the year, and then rose to 4.92 cents a pound in August, the highest monthly average for the year. From this level the price receded to close the year at 4.47 cents. The lowest daily price was 2.575 cents a pound in mid-February and the highest daily price was 5 cents a pound, which held for about a month beginning July 17.

## Gold and Silver

THE PRESIDENT'S comments on silver in his message to Congress obviously contemplate much greater use of the metal in currency. Necessarily, he must await ratification by the other governments signatory to the London agreement (time limit: April 1) before making specific recommendations. Thus far, at least, what he says seems to be in line with Speaker Rainey's remarks to the American Mining Congress convention here last month that we would have a dual standard, with silver entering on a 20 to 1 ratio. That section of the President's message regarding silver follows:

"The foregoing recommendations relate chiefly to gold. The other principle precious metal—silver—has also been used from time immemorial as a metallic base for currencies as well as for actual currency itself. It is used as such by probably half the population of the world. It constitutes a very important part of our own monetary structure. It is such a crucial factor in much of the world's international trade that it cannot be neglected.

"I issued a proclamation providing for the coinage of our newly mined silver and for increasing our reserves of silver bullion, thereby putting us among the first nations to carry out the silver agreement entered into by sixty-six governments at the London Conference. This agreement is distinctly a step in the



right direction and we are proceeding to perform our part of it.

"All of the sixty-six nations agreed to refrain from melting or debasing their silver coins, to replace paper currency of small denominations with silver coins and to refrain from legislation that would depreciate the value of silver in the world markets. Those nations producing large quantities of silver agreed to take specified amounts from their domestic production, and those holding and using large quantities agreed to restrict the amount they would sell during the four years covered by the agreement.

"If all these undertakings are carried out by the governments concerned, there will be a marked increase in the use and value of silver.

"Governments can well, as they have in the past, employ silver as a basis for currency, and I look for a greatly increased use. I am, however, withholding any recommendation to the Congress looking to further extension of the monetary use of silver because I believe that we should gain more knowledge of the results of the London agreement and of our other monetary measures."

An advance summary of silver production during 1933 issued by the Mineral Statistics Division of the Bureau of Mines shows a slight gain during the year in output of the western states and Alaska but a substantial increase in the value of the output. Production of recovered metal by the 13 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Texas, Utah, Washington and Wyoming) totaled 22,895,066 ounces as compared to 22,402,598 ounces in 1932.

Utah, in a position to make an increase because of developed ore bodies, but actually producing during the last three years largely to provide employment, yielded 5,658,000 ounces in 1933 compared with 6,962,097 ounces in 1932. The production from Arizona (2,409,300 ounces), Colorado (2,242,646 ounces), Idaho (7,202,000 ounces), Montana (2,572,000 ounces), and New Mexico (1,186,132 ounces), showed increases; Nevada production (1,115,000 ounces), showed a decrease. The average price for silver was 28.2 cents in 1932 and 34.5 cents in 1933, but this differential was not enough to more than moderately encourage operations, for nearly all of the 1933 production was non-profitable and the result of efforts to provide employment in lead, zinc, and copper districts. The report continues:

"Silver-bearing ores of the western states are nearly all mineralogically complex—lead and lead—(zinc-iron), lead-zinc-copper-iron, or copper. In 1923, when the entire United States (not including the Philippine Islands and Puerto Rico) produced 70,355,674 ounces of silver, the sources of silver according to the United States Bureau of Mines classification were: dry and siliceous ores, 39 percent; copper ores, 21 percent; lead ores, 29 percent; lead-zinc, zinc, and copper-lead-zinc, 11 percent. Since siliceous and dry ores are those low in lead, copper, or zinc, and mined only for the silver content or gold and silver content, the sum of the by-product sources from complex ores was 61 percent. In 1929, when the production was 60,860,011 ounces, the relative sources were siliceous and dry ores, 18 percent; copper 30, lead 19, and lead-zinc, zinc and copper-lead-zinc 33 percent. The sum of the

complex sources was, therefore, 82 percent. In 1932, when the production was only 22,739,669 ounces, the percentages of sources were: Dry and siliceous, 17 percent; copper, 23 percent; lead 22 percent; and lead-zinc, zinc, and copper-lead-zinc, 38 percent. The sum of the complex sources was 83 percent. As most of the ores classified as dry and siliceous also contain some lead, zinc, and copper ore are mined from ore bodies contiguous to lead-zinc ore bodies, thus, strictly speaking, silver mines are practically non-existent.

"Some of the mines most nearly in a straight silver classification are those at Creede, Colo., and the Presidio mine, at Shafter, Texas, both idle since July 1, 1930; and those at Tonopah, Nev., the output of which has been declining rapidly. The 25 leading silver producers, mainly by-product silver mines, yielded 79 percent of the United States output in 1931 and 86 percent in 1932.

"On December 21, 1933, President Roosevelt issued his silver proclamation, which means essentially that newly-mined silver shall be brought by the United States Treasury at a price of 64.5 cents an ounce to the producer. The U. S. Mint was prepared on January 2, 1934, to buy silver at this price from natural products which had been mined subsequent to December 21. The President's proclamation is to "remain in force and effect until the 31st day of December, 1937, unless repealed or modified by Act of Congress or by subsequent proclamation." The four-year provision holds forth the most hope for increase of silver production, for capital can thus plan for a completed operation within that time. In considering future production of silver, reservations should be made dependent on the future prices for copper, lead, and zinc, and on the production provisions in codes for these metals. As a result of the President's silver proclamation, the mines at Creede, Colo., and Shafter, Texas, are already preparing to reopen."

**THE BUREAU OF MINES**, in its advance summary, provides the following information regarding gold production in 1933 and its relation to monetary developments.

#### A POSSIBLE ADDITION TO THE LINE



Thirteen western states in 1933 yielded in recovered metal 1,799,597 fine ounces of gold compared with 1,835,103 ounces in 1932. These figures indicate a decrease of 35,506 ounces of gold, and bear out the statement made in May, 1933, in writing for the United States Bureau of Mines Minerals Year-book 1932-33 (published August, 1933) that "the output of gold in the United States for 1933 will probably show a decrease compared with 1932." Alaska in 1933 yielded 520,418 ounces of gold as compared with 493,860 ounces in 1932.

Although Great Britain went off the gold standard in September, 1931, and was followed within a year by 41 other countries, the United States remained on the gold standard to April, 1933. As long as the United States remained on the gold standard, no matter how many extra shillings over 85 per fine ounce were paid in the foreign market, gold would bring in United States money only \$20.67 per fine ounce, less commission, insurance, and freight. When the United States went off the gold standard and the value of the dollar dropped, sales of gold on the foreign market, if not prohibited, would have bought more of our depreciated dollars than \$20.67. Gold producers protested, therefore, and the Empire Star Mines, Inc., of California, made a test case by attempting to ship via the New York custom house. This led to an announcement by the newspapers on July 27, 1933, of a decision by the Attorney General, that gold in ore, concentrates, unretorted gold amalgam, and unrefined cyanide precipitates could be shipped abroad, whereupon within the next several weeks some gold in unrefined form from the Empire North Star of California and the Homestake of South Dakota was exported.

The Attorney General's decision allowed 75 percent of the United States gold mine production to be shipped to foreign markets and forced 25 percent to remain here at the old price; the President on August 29 issued an order, coupled with an anti-hoarding clause, that the United States government would act as agent through the United States Mint to obtain the world price for newly-mined gold. This arrangement continued until October 25 when the Reconstruction Finance Corporation began buying United States newly-mined gold at prices above the world price; the purchase of foreign gold began at a later date. This price reached \$34.06 on December 18 and so remained to January 15, 1934. The gradually increasing price for gold after August, 1933, resulted principally in increased production of marginal ore in California and Colorado, slightly increased the output of the already profitable Homestake mine, and added a dredge-boat each in Idaho and Montana. The extra price received in notes payable on February 1, 1934, has not only encouraged the established gold producer but has brought rather handsome extra returns. The increased value over the \$47,958,973 (calculated at the legal coinage value of \$20.671835 per fine ounce), represented by the 2,320,015 fine ounces produced by the 13 states and Alaska, amounted between August and December 31 to approximately \$9,000,000. On January 1, 1934, the Reconstruction Finance Corporation announced that it had to that date set aside \$100,000,000 for gold buying and had spent less than \$20,000,000 absorbing domestic newly-mined supplies.



Production of gold in 1933 in the 13 western states and Alaska came mainly from well-established and well-developed mines in old districts. The Alaska output came chiefly from the Alaska-Juneau lode mine and from floating dredge-boats at Fairbanks and Nome. The California output came chiefly from the lode mines of the Grass Valley-Nevada City district and from the floating dredge-boats of the Sacramento Valley. The Colorado output came chiefly from Cripple Creek, Alma, and the San Juan region. The decrease in Colorado's output is plainly in the falling off of output from one mine—the American, a spectacular producer in 1932 from a 600-ft. claim near Alma. The South Dakota output came almost entirely from the long-lived (1876 to date) and well-developed Homestake mine at Lead. The increase in gold output in Arizona from 66,790 ounces in 1932 to 75,813 in 1933 came from the gains at the Lake Superior and Arizona lease at Superior, Arizona gold mines in the Katherine district of Mohave County, and from the copper ore of the United Verde Extension.

## Copper

**P**RELIMINARY statistics released by the Bureau of Mines for 1933 indicated some improvement in the copper industry. Domestic requirements continued to be small, although withdrawals on domestic account increased about 28 percent over those in 1932. Refined primary output from domestic and foreign sources was about 11 percent higher than in 1932. Imports of unmanufactured copper were sharply lower in 1933, decreasing about 30 percent. Largely due to the tariff on copper, imports of refined copper were less than 7 percent of those in the preceding year. Exports of metallic copper were relatively the same in 1933 as in 1932. The gains and losses noted were responsible for a decrease of 15 percent in stocks of refined copper at domestic refineries. A decrease of 4 percent was also reported in stocks of blister and unrefined copper at smelters, in transit to refineries, and at refineries. The average quoted price for copper was 68 percent higher at the end of 1933 than it was at the end of 1932.

The average weekly quoted price of copper (electrolytic, f.o.b. refinery) was 4.775 cents a pound, the lowest quotation on record, from the third week of December, 1932, through the week of March 4, 1933. Then an upward trend took place which, despite minor fluctuations, carried the price to 8.775 cents a pound, the highest quotation of the year, for the first week in August. The price remained at approximately this level for over two months; then it dropped to 7.327 cents a pound during the week of October 21. The price trend was generally upward during the last weeks of the year, and the average weekly quotation was 8.025 cents a pound during the last two weeks of December.

The smelter production of copper from domestic ores in 1933 as determined by the Bureau of Mines from reports of the smelters showing actual production for 11 months and estimated production for December, was 477,000,000 pounds, compared with 544,009,948 pounds in 1932, and was the smallest production recorded since 1896. The estimated smelter production from domestic ores for December, as reported by the smelters, was

nearly 40,000,000 pounds, which is approximately the average reported for the 11 months preceding.

The production of new refined copper from domestic sources, determined in the same manner as smelter production, was about 480,600,000 pounds, compared with 445,077,874 pounds in 1932. The output of new refined copper from domestic and foreign sources in 1933 amounted to about 756,200,000 pounds, compared with 680,867,734 pounds in 1932—an increase of 75,300,000 pounds or 11 percent. The production of secondary copper by primary refineries increased from 120,454,527 pounds in 1932 to about 150,100,000 pounds in 1933. Thus the total primary and secondary output of copper by the refineries in 1933 was 13 percent higher than in the preceding year—a production of about 906,300,000 pounds being reported for 1933 as compared with 801,322,261 pounds in 1932.

The imports of unmanufactured copper during the first 11 months of 1933, according to the Bureau of Foreign and Domestic Commerce, amounted to 250,853,565 pounds, or at a monthly rate of nearly 23,000,000 pounds. This compares with total imports of 391,991,342 pounds for the entire year 1932, or at a monthly rate of 32,700,000 pounds. Imports in November, 1933, totaled 30,676,575 pounds. The total imports for 1933 will very likely show a decrease of approximately 116,000,000 pounds for the year, or a drop of about 30 percent.

The exports of metallic copper during the first 11 months of 1933 amounted to 273,817,517 pounds as compared with 295,356,719 pounds exported during the entire year 1932. It is likely that the total for the entire year 1933 will be little different from that for 1932. In the first 11 months of 1933, 220,141,601

pounds of refined copper in ingots, bars, and other forms, and 15,295,295 pounds of rods were exported. Of the total quantity, France received 65,335,069 pounds, the largest amount. Germany was next with 28,676,819 pounds; Italy was third with 26,699,636 pounds; and the United Kingdom fourth with 24,532,385 pounds. In the entire year 1932 the United Kingdom received the largest quantity, 68,344,096 pounds; France was next with 65,306,278 pounds; Germany was third with 30,806,376 pounds; and Italy fourth with 23,344,238 pounds.

Refineries reported that at the end of 1933 approximately 851,000,000 pounds of refined copper would be in stock, a 15 percent decrease from the reserve of 1,004,000,000 pounds at the end of 1932. It is estimated that stocks of blister copper at the smelters, in transit to refineries, and at refineries, and materials in process of refining, would be about 362,000,000 pounds on December 31, compared with 378,000,000 pounds at the end of 1932, a decrease of 16,000,000 pounds or 4 percent. Total smelter and refinery stocks at the end of 1933 were 1,213,000,000 pounds, representing a decrease of 169,000,000 pounds, or 12 percent, from the record stocks at the end of 1932.

Stocks of refined copper on November 30, 1933, were reported as 856,000,000 pounds, and stocks of blister copper at smelters, in transit, and at refineries were reported as 357,000,000 pounds.

The quantity of new refined copper withdrawn on domestic account during the year was about 665,100,000 pounds, compared with 519,200,000 pounds in 1932, an increase of 145,900,000 pounds or 28 percent. The method of calculating domestic withdrawals is shown as follows:

The average value of the ore per gross ton at the mines in 1933 is esti-

NEW REFINED COPPER WITHDRAWN FROM TOTAL YEAR'S SUPPLY ON DOMESTIC ACCOUNT, 1932-1933, IN POUNDS

	1932	1933
Refinery production of new copper from domestic sources	445,100,000	480,600,000
Refinery production of new copper from foreign sources	235,800,000	275,600,000
Imports of refined copper (December, 1933, estimated)	167,800,000	10,900,000
Stocks of new refined copper on January 1	924,600,000	1,004,000,000
	1,773,300,000	1,771,100,900
Exports of refined copper (ingots, bars, rods, or other forms) (December, 1933, estimated)	250,100,000	255,000,000
Stocks December 31	1,004,000,000	851,000,000
	1,254,100,000	1,106,000,000
Total withdrawn on domestic account	519,200,000	665,100,000

## Iron and Steel

**T**HE iron ore mined in the United States in 1933, says the U. S. Bureau of Mines, exclusive of ore that contained 5 percent or more of manganese in the natural state, is estimated by the United States Bureau of Mines, at 17,511,000 gross tons, an increase of 78 percent as compared with the quantity mined in 1932, which was one of the most disastrous years in the history of the American iron and steel industry. The ore shipped from the mines in 1933 is estimated at 24,608,000 gross tons, valued at \$63,744,000, an increase of 362 percent in quantity and of 394 percent in total value compared with the figures for 1932. Compared with the five-year average for 1928 to 1932, which amounted to 45,616,803 tons valued at \$117,115,655, the 1932 shipments showed a decrease of 46 percent in both quantity and value.

ated at \$2.59; in 1932 it was \$2.42. This increase is partly explained by the large proportionate gain in tonnage of the high valued Lake Superior ores that in 1933 accounted for 87 percent of the nation's total as compared with 67 percent in 1932. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, decreased 38 percent from 17,603,873 gross tons in 1932 to 10,944,000 tons in 1933.

### LAKE SUPERIOR DISTRICT

About 87 percent of the iron ore shipped in 1933 came from the Lake Superior district, in which approximately 14,594,000 gross tons were mined and 21,510,000 tons were shipped, increases of 79 and 501 percent, respectively, compared with the quantities mined and shipped in 1932. The ore shipped in 1933 was valued at the mines at \$58,474,000, an increase of 492 percent.

These totals include the ore shipped by rail as well as by water from all mines, but exclude manganiferous ores amounting to approximately 204,000 gross tons in 1933, and 10,981 tons in 1932 that contained 5 percent or more of manganese in the natural state. The stocks of iron ore in this district decreased from 16,408,186 gross tons in 1932 to 9,935,000 tons in 1933, or 39 percent. The shipments of iron ore by water from the Lake Superior district in 1933 (including manganiferous iron ores), according to the Lake Superior Iron Ore Association, amounted to 21,623,898 gross tons, an increase of 507 percent compared with these shipments in 1932. The average value of the ore at the mines in the Lake Superior district in 1933 was \$2.72 a ton; in 1932 it was \$2.76.

#### SOUTHEASTERN STATES

The Southeastern States, in which the Birmingham district is the largest iron-ore producing area, mined approximately 2,138,000 gross tons of iron ore in 1933, an increase of 52 percent compared with 1932. The shipments of iron ore from mines in these states in 1933 amounted to 2,158,000 gross tons, valued at \$3,239,000, increases of 44 and 29 percent, respectively, in quantity and value compared with 1932. The average of the ore produced in these states in 1933 per gross ton was \$1.50; in 1932 it was \$1.67. The stocks of iron ore at the mines in this group of states, mainly in the Birmingham district, decreased from 807,109 gross tons in 1932 to 787,000 gross tons in 1933.

#### NORTHEASTERN STATES

The Northeastern states, which include the Adirondack district, New York, and the Cornwall district, Pennsylvania, in 1933 mined 400,000 gross tons of iron ore, an increase of 142 percent over 1932. The iron ore shipped from mines in these states amounted to 561,000 tons, valued at \$1,523,000, increases of 368 and 333 percent, respectively, in quantity and value compared with 1932. The stocks of iron ore in this group of states decreased from 376,413 gross tons in 1932 to 209,000 tons in 1933. The average value of the ore in these states in 1933 per gross ton was \$2.71; in 1932 it was \$2.93.

#### WESTERN STATES

In 1933 Utah, Washington, and Wyoming, which mined and shipped 379,000 gross tons, valued at \$508,000, were the only Western states to report any iron ore mining.

#### IMPORTS AND EXPORTS

The imports of iron ore reported for the 11 months ended November 30, 1933, amounted to 775,619 gross tons, valued at \$1,834,301. The imports for the year 1932 were 582,498 gross tons, valued at \$1,539,374. The reported exports of iron ore for the 11 months ended November 30, 1933, amounted to 155,220 gross tons, valued at \$646,213, compared with exports for the entire year 1932 of 83,449 tons, valued at \$219,852. These statistics of imports and exports were compiled from the records of the Bureau of Foreign and Domestic Commerce.

French export trade in iron and steel products registered material improve-

ment in 1933 as compared with the preceding year, according to a report compiled in the Commerce Department's Iron and Steel Division.

During the 11-month period ended November 30, 1933, total shipments of such products from France amounted to 2,315,591 metric tons, an increase of 277,598 tons over the corresponding period of 1932.

The export gain was quite general throughout the trade, with 14 classes of material showing increases and only four decreases, the report shows. The largest gain was that made by steel bars, the 1933 shipments exceeding the 1932 figure by 11,334 tons.

Other noteworthy increases occurred in the case of ingots, blooms, billets and slabs, and cast iron manufactures.

Pig iron was the only iron and steel product which registered a substantial decline in 1933, shipments decreasing by 17,424 tons. Of the other three classes which showed declines, the drop in only one was as great as 100 tons.

It is apparently from the above figures, the report points out, that while France's total export trade in iron and steel products for the full year 1933 will not approach the high levels of 1928 and 1929, it will show a gratifying improvement over 1932.

Iron-ore interests in Spain are said to be concerned over the growing tendency of British blast furnace operators to replace Spanish ore with the lower-priced mineral brought from Africa, according to the Commerce Department.

During the January-October period of 1933, British imports of ore from Spain are reported to have totaled 732,000 tons, a fair increase over the 669,000 tons imported in the corresponding period of 1932. However, according to figures published in Spain, British takings of Algerian ore rose from 231,000 to 519,000 metric tons during the same period.

Total exports of iron ore from Spain in the nine-month period ended September, 1933, amounted to 1,068,960 metric tons compared with 979,146 tons for the corresponding period of 1932.

### Quicksilver Code

A PUBLIC hearing on the proposed code of fair competition for the quicksilver industry, sponsored by the National Quicksilver Producers, was held by Deputy Administrator Walter A. Janssen on February 2. The code provides for a 40-hour maximum work-week, an 8-hour maximum work day and a minimum hourly wage rate of 42½ cents in the North and 30 cents in the Southern district.

Donald R. Richberg, general counsel for the National Recovery Administration, recently issued the following statement:

"This seems to be an appropriate time to recall to the attention of the public and to those industries now operating under codes the fact that the provisions of the anti-trust laws of the United States are still in full force and effect and that monopolistic practices are not permitted even under the provisions of codes.

"The National Industrial Recovery Act does provide that any action complying with the provisions of a code shall be exempt from the provisions of the anti-

trust laws of the United States. This does not mean two things:

"First—this does not mean that a code can be written so as to authorize monopolistic practices.

"Second—it does not mean that, under the protection of a code, industrial groups can organize and then, without regard to the requirements of the code, proceed to fix prices, or to carry out other operations in restraint of trade, free from the penalties of the anti-trust laws.

"It is necessary to call these matters to the attention of the public and of industry for two reasons.

"In the first place, there has been a widespread misunderstanding, even among public officials, that monopolistic practices might be sanctioned in the codes.

"In the second place, there have recently come to the attention of the Administration instances in which industrial operators have been organized to carry out the provisions of codes and then have proceeded to disregard their obligations under the codes or the restrictions upon them in the codes. Without singling out one group, it should be stated that during the meetings of the National Industrial Bituminous Coal Board it became evident that some groups of coal operators had the impression that they were now free to fix prices and otherwise to act in combination without obtaining the approval of the representatives of the NRA, which is designed to safeguard the public interest.

"It cannot be too strongly emphasized that no combinations of industrial operators are authorized to take concerted actions, except so far as explicitly authorized under the terms of the codes and the requirements of the NRA, without subjecting themselves to the penalties of the anti-trust laws wherever such laws would prohibit such combined action.

"A timely warning should be given that, wherever members of an industry have assumed mistakenly that they have been licensed by virtue of the adoption of a code to combine and to disregard the restrictions imposed by the NRA to protect the public interest, they are simply laying themselves open to prosecution under the anti-trust laws and that the provisions of Section 5 of Title I of the National Industrial Recovery Act do not exempt them from the penalties of those laws."

FRANK G. FREY, acting director of the Anthracite Institute, has joined the staff of the M. A. Hanna Company as sales promotion manager, with his headquarters at Philadelphia.

Mr. Frey was appointed acting director of the Institute upon the resignation of its president, General Brice P. Disque, last autumn. During the preceding three years Mr. Frey was assistant director and then director of anthracite service, including the laboratory, scientific research and field service functions of the organization. By appointment of Harry C. Hopkins, Federal Relief Administrator, Mr. Frey was also agent of the Relief Administration for the distribution of relief anthracite for the unemployed.

Mr. Frey joined the anthracite operators' organization in July, 1928, as a combustion engineer in the Philadelphia office, after several years in the engineering departments of steamship companies.



# METAL MINING IN 1933

## Arizona

The value of gold, silver, copper, lead, and zinc produced from mines in Arizona in 1933 was \$9,686,178, a decrease of about \$3,850,000 from 1932, according to Bureau of Mines.

Gold production increased about 12 percent over 1932, and silver about 20 percent. Copper continued to decline to 38 percent below 1932 and nearly 72 percent below the 1931 output. The output of lead was practically the same as that in 1932, and the zinc production was insignificant.

The gold output increased from 66,789.67 ounces valued at \$1,380,665 in 1932 to 75,813 ounces valued at \$1,567,194 in 1933 based on the legal coinage rate of \$20.671835 per fine ounce.

The silver output increased from 2,082,823 ounces in 1932 to about 2,409,300 ounces in 1933, and the value from \$587,356 to \$831,209, as the price of silver increased from 28.2 cents an ounce in 1932 to 34.5 cents an ounce in 1933.

The copper output decreased from 182,491,825 pounds in 1932 to about 112,500,000 pounds in 1933, a decline of 69,991,800 pounds or 38 percent, and the value from \$11,496,985 to about \$7,201,600.

The lead production in Arizona decreased slightly from 2,364,300 pounds in 1932 to about 2,300,000 pounds in 1933, but the value increased from \$70,929 to about \$85,100 as the average price of lead increased from 3 to 3.7 cents a pound. No lead ore was smelted in Arizona in 1933 and many of the large producers of lead remained idle.

## California

The value of the gold, silver, copper, lead, and zinc produced in California in 1933, in terms of recovered and recoverable metals and with gold reckoned at the statutory price of \$20.671835 per fine ounce, is estimated at \$12,473,351, according to the Bureau of Mines. This estimate compares with a total value of \$12,066,750 for the output of the five metals in 1932. In terms of quantity the output of gold increased, while that of silver, copper, and lead was less than in 1932; the output of zinc was nominal.

In 1933 California maintained its leading position among the gold-producing States, and the year's output of about 592,400 ounces was roughly 23,233 ounces more than the 569,167 ounces mined in 1932. The value of the 1933 production, calculated at the legal coinage rate of \$20.671835 per fine ounce, was about \$12,245,995. Using the world price and the Reconstruction Finance Corporation price from August through December would add approximately \$1,971,600 to the value of the 1933 gold output and increase the value of the State's production of the five metals to about \$14,445,000.

Newly mined gold was marketed under four different sets of regulations, and at varying prices, successively during the year. Until August 12, gold was sold by producers to the Mint at the statutory price of \$20.671835 per fine ounce. From August 12 to August 29, gold-bearing ores, concentrates, precipitates, and amalgam—but not bullion—could be exported and sold at the world price. During the period from August 29 until October 25, newly mined gold was accepted at the Mint by the Government, which acted as agent for the producers in disposing of the metal at approximately the London price. Under the Executive Order of October 25, 1933, gold was accepted by the Mint for sale to the Reconstruction Finance Corporation at varying rates, officially determined, which have in the main been somewhat higher than the London open market price and have ranged upward from \$29.25 per ounce.

Silver decreased from 493,533 ounces in 1932 to about 352,700 ounces in 1933. Because of a better average price—about 34.5 cents per ounce in 1933 as against 28.2 cents in 1932—the value of the silver output decreased to a less extent, and was about \$121,682 in 1933, compared with \$139,176 in 1932. Most of the silver was recovered from gold ores as a by-product, and more than half of it came from the Grass Valley-Nevada City district.

Copper decreased from 1,417,876 pounds, valued at \$89,326, in 1932, to about 1,145,000 pounds, valued at \$73,280, in 1933. This is the smallest production since 1895, when an output of 225,650 pounds, valued at \$21,901, was made.

Lead production decreased from 2,417,416 pounds, valued at \$72,522, in 1932, to about 703,500 pounds, valued at \$26,030, in 1933, which represents the lowest output since 1907, when 328,681 pounds, valued at \$16,690, was produced. During 1933 about 148,000 pounds of zinc, valued at \$6,364, was shipped in the form of carbonate ore.

## Colorado

Eleven and one-half months actual mine production with an estimate by the mine operators and smelters for one-half of December indicates that the output of gold, silver, copper, lead, and zinc from Colorado ores and gravels in 1933 in terms of recovered and estimated recoverable metals was 242,008 ounces of gold, 2,242,646 ounces of silver, 4,510,000 pounds of lead, 9,948,000 pounds of copper, and 2,491,000 pounds of zinc, according to the Bureau of Mines. These figures are to be compared with 317,928 ounces of gold, 1,860,408 ounces of silver, 4,299,000 pounds of lead, 7,398,000 pounds of copper, and 218,000 pounds of zinc in 1932. Compared with 1932, gold shows a decrease of 75,920 ounces, silver an increase of 382,238 ounces, lead an in-

crease of 211,000 pounds, copper an increase of 2,550,000 pounds, and zinc an increase of 2,273,000 pounds. The gross estimated value of the output of metals in Colorado in 1933 is gold, \$5,002,749, silver \$773,713, lead \$166,870, copper \$636,672, zinc \$107,113, or a total of \$6,687,117, as compared with \$7,698,373 in 1932. From 1858 to 1933, inclusive, Colorado has produced, in terms of recoverable metals, 35,404,534 ounces in gold, 664,230,887 ounces of silver, 4,616,149,583 pounds of lead, 330,751,430 pounds of copper, and 2,232,834,985 pounds of zinc, with a total value for the five metals of \$1,675,585,219.

## Idaho

The value of gold, silver, copper, lead, and zinc produced from mines in Idaho in 1933, according to the Bureau of Mines, was \$11,211,718, an increase of \$3,334,114 over the total value of the metals in 1932. Each of the five metals increased in quantity and value and there was a pronounced improvement in the production of gold, silver and zinc. The production of lead, so important to the mining industry of Idaho, showed an increase in quantity in 1933, as well as a relatively larger gain in value accounted for by the rise in price.

The three features of the year which affected production were the increase in gold from new and old properties, the unusually large silver production from the Sunshine mine near Kellogg, and the increased production of silver, lead, and zinc from the Morning mine of the Federal Mining & Smelting Co. The large production of silver from the largest single silver-producing mine in the United States and the output from other large producers gave Idaho first place in silver production in the United States, a position held by Utah from 1920 to 1932.

The mine output of gold in 1933 was about 61,208 ounces as compared with 46,885.39 ounces in 1932, an increase of about 31 percent. The value of the output in 1933 at the legal coinage value of \$20.671835 per fine ounce, was \$1,265,282.

The output of silver increased from 6,716,968 ounces in 1932 to about 7,202,000 ounces in 1933 and the value from \$1,894,185 to about \$2,484,690. The increase in quantity of more than 485,000 ounces was due chiefly to the increased production of lead-zinc ore from the Morning mine at Mullan.

The output of copper increased from 1,143,381 pounds in 1932 to about 1,464,600 pounds in 1933, and the value from \$72,033 to \$93,734.

The output of lead increased from 144,235,067 pounds in 1932 to about 149,761,000 pounds in 1933, and the value from \$4,327,052 to about \$5,541,157. The increase was due chiefly to the larger output of lead-zinc ore from the Morning mine of the Federal Mining & Smelting Co., encouraged by the improvement in metal prices. The State maintained its position as the second largest producer of lead in the United States, after Missouri.



The zinc produced from mines in Idaho increased from 20,504,234 pounds in 1932 to about 42,485,000 pounds in 1933, and the value from \$615,127 to about \$1,826,855.

About 1,106,000 tons of ore, old tailings, etc., were produced in Idaho in 1933, an increase of about 73,000 tons over the output in 1932.

### Montana

The value of gold, silver, copper, lead, and zinc produced from mines in Montana in 1933, according to the Bureau of Mines, was \$8,469,580, or \$1,612,843 more than the value of the output in 1932. The increase in the total value of the five metals in 1933 was due to the resumption of the mining of lead-zinc ore at Butte, the general increase in metal prices, and to the continued activity in gold mining. These gains were offset in part by the reduced output from copper mines at Butte. The output of each metal, except copper, showed marked increases over 1932; gold from 40,602 to 51,102 ounces, silver from 1,686,213 to 2,572,000 ounces, lead from 2,157,766 to 12,084,000 pounds, and zinc from 4,393,034 to 43,448,000 pounds; the output of copper decreased from 84,847,349 to 65,789,000 pounds.

### Nevada

The value of the gold, silver, copper, lead, and zinc produced from mines in Nevada during 1933, in terms of recovered metals, was about \$5,720,815, according to the Bureau of Mines. In arriving at this figure, which indicates that the total value of the mine production increased about \$653,644 from the 1932 total of \$5,067,171, gold was valued at the statutory price of \$20.671835 per fine ounce.

The gold output of Nevada decreased from 129,719.83 fine ounces, valued at \$2,681,547, in 1932 to about 105,000 ounces, valued at about \$2,170,543, in 1933.

Despite the interest in gold mining that characterized the year, production of the metal was nearly 20,000 ounces less than in 1932.

Silver was about 1,115,000 ounces, valued at about \$384,675. These figures compare with a 1932 production of 1,304,365 ounces, valued at \$367,831; they represent a decrease of approximately 189,365 ounces in quantity, but an increase of about \$16,844 in value.

Copper was about 38,900,000 pounds of recovered and recoverable metal, valued at about \$2,489,600. This compares with an output of 31,487,606 pounds, valued at \$1,983,719, in 1932.

Relatively large increases in the production of lead and zinc were made in 1933, largely as a result of the resumption of operations at the Pioche mines of the Combined Metals Reduction Co., and the marketing by the Treadwell Yukon Co. of a substantial tonnage of zinc concentrate that had been produced at Tybo in 1930 and 1931.

In 1933, about 4,731,000 pounds of lead, valued at \$175,047, and about 11,650,000

pounds of zinc, valued at \$500,950, were marketed from Nevada mines. Corresponding figures for 1932 were: Lead, 880,986 pounds, valued at \$26,430; zinc, 254,795 pounds, valued at \$7,644.

### New Mexico

Eleven months actual mine production with an estimate by the mine operators for December indicates that the output of gold, silver, copper, lead and zinc from New Mexico ores and gravels in 1933 in terms of recovered and estimated recoverable metal was 25,964 ounces of gold, 1,186,132 ounces of silver, 21,537,000 pounds of lead, 27,264,000 pounds of copper, and 62,729,000 pounds of zinc, according to the Bureau of Mines. These figures compare with a production in 1932 of 23,208 ounces of gold, 1,142,351 ounces of silver, 20,227,000 pounds of lead, 28,419,000 pounds of copper, and 51,186,000 pounds of zinc, and show increases of 2,756 ounces of gold, 43,781 ounces of silver, 1,310,000 pounds of lead, 11,543,000 pounds of zinc and a decrease of 1,155,000 pounds of copper.

The gross value of the New Mexico metal production at average yearly prices of \$20.671835 per ounce of gold, \$0.345 per ounce of silver, \$0.037 per pound of lead, \$0.064 per pound of copper, and \$0.043 per pound of zinc in 1933 was gold \$536,724, silver \$409,216, lead \$796,869, copper \$1,744,896, and zinc \$2,697,347, with a total of \$6,185,052 as compared with \$4,734,683 in 1932, an increase for 1933 of \$1,450,369, or 30.63 percent.

The large low-grade porphyry copper deposit of the Chino Mines of the Nevada Consolidated Copper Co., at Santa Rita, was mined at approximately 3,200 tons daily (actually about 6,400 tons daily for only 15 days of each month), as compared with 6,474 tons daily for 180 days in 1932.

### Oregon

The total value of the gold, silver, copper, lead, and zinc mined from placers and lodes in Oregon during 1933, in terms of recovered and recoverable metals and with gold calculated at the statutory price of \$20.671835 per fine ounce, was about \$423,500 according to the Bureau of Mines. The total value of the 1932 output was \$415,627. About 20,200 ounces of gold, valued at about \$417,571 at the mint price of \$20.671835 per fine ounce, was mined in 1933, as against 19,861 ounces, valued at \$410,568, in 1932.

Gold was the principal metal produced, and virtually all of the silver, copper, lead, and zinc reported was recovered in the treatment of gold ores and placer material. About 13,000 ounces of silver, valued at \$4,485, was produced in 1933, compared with 8,616 ounces, valued at \$2,430, in 1932. Copper estimated at 6,700 pounds, valued at \$420, was produced during the year, showing a decline from the 1932 output of 32,199 pounds, valued at \$2,029. About 10,000 pounds of lead, valued at \$370, and 15,600 pounds of zinc, valued at \$671, were produced during 1933; equivalent figures for 1932 were 7,917 pounds of lead, valued at

\$238, and 12,061 pounds of zinc, valued at \$362.

### South Dakota

Reports from metal mines and receipts at smelters and the United States mint indicate that the production of mines in South Dakota in 1933 was 510,058 ounces of gold and 127,529 ounces of silver, according to the Bureau of Mines. This compares with the production in 1932 of 480,338 ounces of gold and 126,195 ounces of silver.

The Homestake mine, at Lead, the largest producing gold mine in the United States, was operated continuously. For 1932, this company's report showed 1,401,593 tons mined; the proceeds from gold-silver bullion by amalgamation followed by cyanidation of sands and slimes were \$9,911,858; the dividends paid were \$2,662,296. From 1876 to 1932, inclusive, this mine has yielded bullion and concentrates valued at \$253,394,489 and has paid \$62,653,282 in dividends. Dividends paid in 1933 were \$3,747,307.

### Utah

The mines of Utah in 1933 produced gold, silver, copper, lead, and zinc valued at \$15,842,196, an increase of \$1,443,603 compared with 1932, according to the Bureau of Mines. Increases were recorded in the output of copper and zinc but there were declines in the output of gold, silver, and lead. The value of the output of lead, however, was larger than in 1932 due to the increase in the average price of lead from 3 cents a pound in 1932 to 3.7 cents a pound in 1933. The quantity of silver produced in 1933 decreased more than 1,300,000 ounces but as the price of silver increased from 28.2 cents in 1932 to 34.5 cents in 1933 the value of the silver output was only slightly less than that in 1932.

Utah has been first in the United States in the production of silver since 1920, but in 1933 Idaho took first place and Utah ranked second. The State also ranked second in copper after Arizona, and third in lead after Missouri and Idaho.

Utah's gold output decreased from 135,256.35 ounces in 1932 to about 108,841 ounces in 1933. The value of the output at the legal coinage rate of \$20.671835 an ounce, was \$2,249,943, compared with \$2,795,997 in 1932, and \$4,108,323 in 1931.

The silver output decreased from 6,962,097 ounces in 1932 to about 5,658,000 ounces in 1933, and the production was about 1,544,000 ounces less than that of Idaho. The value of the silver output decreased slightly from \$1,963,311 in 1932 to about \$1,952,010 as the average price of silver increased from 28.2 cents in 1932 to 34.5 cents in 1933.

Utah was the only State in the west showing an increase in copper production, the result of the increase was in the output of copper ore from the property of the Utah Copper Co. The State usually ranks third in copper production after Arizona and Montana, but in 1933 it ranked second, producing about 7,257,000 pounds more than Montana. The

production of copper increased from 64,964,111 pounds in 1932 to about 73,046,000 pounds in 1933. The value increased from \$4,092,739 in 1932 to \$4,674,944 in 1933. The Utah Copper Co. was credited with more than 94 percent of the total copper produced in the State in 1933.

The lead output decreased from 125,552,966 pounds in 1932 to about 114,762,000 pounds in 1933, but the value increased from \$3,766,589 to \$4,246,194, as the average sales price of lead increased from 3 cents a pound to 3.7 cents a pound. The quantity of lead produced in 1933 was more than 8 percent less than the output in 1932, but the State remained third as a producer of lead in the United States after Missouri and Idaho.

The zinc, recovered from crude ore and concentrates, increased from 59,331,888 pounds in 1932 to about 63,235,000 pounds in 1933, and the value of the output increased from \$1,779,957 to about \$2,719,105, as the average sales price of the various grades increased from 3 cents a pound in 1932 to 4.3 cents a pound in 1933.

In 1933 the mines of Utah produced about 4,050,000 tons of ore and old tailings, an increase from 3,768,542 tons in 1932.

#### Washington

The value of gold, silver, copper, lead, and zinc produced from mines in the State of Washington in 1933 was about \$487,211 compared with \$300,263 in 1932, according to the Bureau of Mines. The production of lead and zinc increased decidedly over the production in 1932; lead increased nearly 369,000 pounds and zinc nearly 2,500,000 pounds. The production of gold and silver was slightly less and the output of copper was practically the same as that in 1932.

The production of gold decreased from 5,082.13 ounces in 1932 to about 4,800 ounces in 1933. The value of the output at the legal coinage rate of \$20.671835 per fine ounce was \$99,925.

The output of silver in the State decreased from 17,412 ounces in 1932 to about 16,500 ounces in 1933, but the value increased from \$4,910 to \$5,692, as the average price increased from 28.2 cents an ounce to 34.5 cents an ounce.

Copper in 1933 was practically the same as that in 1932 (5,524 pounds).

Lead increased from 1,842,267 pounds, valued at \$55,268 in 1932 to about 2,210,000 pounds, valued at \$81,770 in 1933.

The production of zinc increased from 4,489,334 pounds in 1932 to about 6,980,000 pounds in 1933, and the value from \$134,680 to about \$300,140.

#### Wyoming

The estimated output of metal mines in Wyoming in 1933 in terms of recoverable metal was 2,203 ounces of gold and 259 ounces of silver, according to the Bureau of Mines, compared with 257 ounces of gold, 195 ounces of silver, 9,800

pounds of lead, and 397 pounds of copper in 1932. The comparatively large increase in the production of gold in 1933 over 1932 resulted chiefly from operations of a traction dredge from May 1 to December 1 on the property of the Timba-Bah Mining Co. on Rock Creek, Atlantic City district, Fremont County. The bulk of the other production in 1933 came from shipments of amalgamation and placer bullion from the same district.

### Manganese Ore Industry in 1933

PRELIMINARY returns received by the United States Bureau of Mines from all present known producers of manganese and manganiferous ores in 1933 indicate that the shipments of ore containing 35 percent or more manganese were slightly more than in 1932; that the shipments of ore containing 10 to 35 percent manganese were considerably less than in 1932; and that the shipments of ore containing 5 to 10 percent manganese were substantially greater than in 1932.

Shipments of manganese ore containing 35 percent or more metallic manganese from domestic mines (exclusive of Puerto Rico) in 1933 were approximately 18,500 long tons valued at \$447,000, compared with 17,777 tons valued at \$377,222 in 1932. Compared with the five-year average for 1928 to 1932, which amounted to 46,259 tons, the 1933 shipments showed a decrease of 60 percent. Shipments of manganese ore from Puerto Rico to the United States during the 11 months ended November 30, 1933, were 1,138 long tons valued at \$46,250, compared with shipments for the entire year 1932 of 2,302 tons valued at \$65,509.

The total shipments of manganese ore in 1933 (exclusive of Puerto Rico) consisted of 10,700 tons of metallurgical and miscellaneous ores valued at \$185,500 (10,765 tons valued at \$137,955 in 1932) and 7,800 tons of battery ore valued at \$261,500 (7,012 tons valued at \$239,267 in 1932).

Manganese ore was reported shipped from Alabama, Arkansas, Georgia, Montana, Virginia, and West Virginia in 1933 in quantities ranging from about 100 tons in West Virginia to about 9,200 tons in Montana. Montana and Virginia together supplied about 13,800 tons, or about 75 percent of the total shipments.

The imports of manganese ore for the 11 months ended November 30, 1933, amounted to 152,169 long tons containing 76,785 tons of metallic manganese, compared with 110,634 tons of ore containing 53,553 tons of metallic manganese during the entire year 1932. Of the ore imported in 1933, 83,780 tons were from Soviet Russia, 39,546 tons were from the Gold Coast, and 28,257 tons were from Cuba.

Shipments of domestic ore containing 10 to 35 percent manganese (ferruginous manganese ore) in 1933 were about 12,000 long tons, compared with 15,635 tons in 1932. Compared with the five-year average for 1928 to 1932, which amounted to 65,177 tons, the 1933 shipments showed a decrease of 82 percent. The ferruginous manganese ore shipped in 1933 was from Alabama, Arkansas, Georgia, and Virginia.

Shipments of domestic ore containing 5 to 10 percent manganese (manganiferous iron ore) in 1933 were about 204,000 long tons valued at \$542,000, compared with 9,799 tons valued at \$29,546 in 1932. Compared with the five-year average for 1928 to 1932, which amounted to 626,118 tons, the 1933 shipments showed a decrease of 67 percent. All the manganiferous ore shipped in 1933 came from Minnesota and Michigan.

### Sulphur

AUSTRALIA'S imports of American sulphur during the last fiscal year were notably in excess of the 1931-32 period, according to a report to the Commerce Department.

During the 12 months ended June 30, 1933, imports of sulphur from the United States totaled 1,118,338 cwt., compared with 610,940 cwt. in the preceding fiscal period. Total imports of sulphur into Australia during the 1932-33 period amounted to 1,868,907 against 658,346 cwt. in the 1931-32 fiscal year.

The improved agricultural situation, resulting in a better demand for superphosphate, accounted for the increased imports of sulphur into the Australian market, the report states.

After the United States, Italy and Japan are the chief suppliers of sulphur to the Commonwealth. Because of depreciated yen, Japan was able to increase its sales from practically nothing in 1930-31 to 392,245 cwt. in the past fiscal year.

During the current fiscal year, the report points out, imports of sulphur by Australia have somewhat declined, but at the same time the dollar exchange situation has placed American sulphur in a much better competitive position. It is the opinion of local importers that even though total imports of sulphur should decrease in the current year, imports of the American product will be maintained.

### California's Mineral Industries in 1932

COMPILATION of the final returns from the mineral producers of California for 1932 by the statistical section of the State Division of Mines, under the direction of Walter W. Bradley, State mineralogist, shows the total value for the year to have been \$199,196,493, being a decrease of \$16,767,927 from the total of 1931 of \$215,964,420. There were 50 different mineral substances exclusive of a segregation of the various stones grouped under gems; and all but one of the 58 counties of the State contributed to the list.

The State mineralogist, Walter W. Bradley, announces that Bulletin 104, of the California State Division of Mines, is just off the press and ready for distribution.

This bulletin of over 400 pages contains a complete list of all publications that could be found on the geology, mines, oil, coal, mineral deposits, fossils, earthquakes, rock formations, etc., covering the State of California. The references, though abbreviated, are given in great detail and listed alphabetically according to authors.

# ACCIDENT-PREVENTION RECORD OF THE METAL-MINING INDUSTRY IN THE UNITED STATES IN 1932, INCLUDING NONMETALLIC-MINING OTHER THAN COAL

THE METAL and non-metal mining industry, exclusive of coal mining, in the United States showed a reduction in its nonfatal accident rate and a slight increase in its fatality rate in 1932, the former having declined from 55.76 per million man-hours in 1931 to 54.48 per million man-hours in 1932, while the latter increased from 1.01 to 1.16. However, if we add the two rates—fatal and nonfatal—together, the general safety record of the industry in 1932 was slightly better than in the preceding year, the rates being 55.64 and 56.77, respectively. These figures are based upon information contained in yearly reports furnished by operating companies to the United States Bureau of Mines.

The industry employed a total of 53,288 men in 1932, of whom 31,321 worked underground and 5,465 in open-cut mining; and the remainder—16,502—in the surface shops and yards. This total compare, with a total of 80,940 men employed by the industry in 1931 and represents a considerable decrease from the total number of men employed by the industry during any other year for which complete figures of this character are available. Each of these men worked on an average 208 shifts or 1,727 hours during the year, as compared with 231 shifts or 1,930 hours, during the preceding year. Fatal accidents among them amounted to 107 and nonfatal accidents to 5,014, a decline of 51 and 3,695, respectively, as compared with 1931.

The rates of both fatal and nonfatal accidents in 1932 varied considerably from state to state, the fatality rate from nil to 3.68 and the nonfatal-injury rate from nil to 127.37. Thirty-two states (including Alaska) had a fatal-accident rate and 23 states (including Alaska) a nonfatal accident rate below the corresponding average accident rate for the entire industry. The first group of states includes 20 states and the second 2 states whose accident rate was nil. The principal mining states with a fatal and nonfatal accident rate both below the corresponding average accident rate for the entire industry included Alabama, Arizona, Michigan, Minnesota, Missouri, Nevada, New Mexico, South Dakota, Tennessee, Texas, and the territory of Alaska. Principal mining states in this instance are considered states which in 1932 employed 1,000 men or more in this industry.

There was, also, a variation in the

rates of both fatal and nonfatal accidents from one branch of the industry to another, the fatality rates ranging from 0.44 to 1.63 and the injury rates from 16.59 to 74.39. The industry in this study is divided into five branches,

of which only two had a fatal and non-fatal accident rate both below the corresponding accident rate for the entire industry. These two branches were the iron and nonmetallic-mineral groups. Most of the personnel of the iron mines, like most of the personnel of the other branches of the industry, with the exception of the nonmetallic mines, is employed in underground, as distinguished from open-cut mining; and the exceptionally favorable safety record of open-cut mining is largely due to the less hazardous nature of the work as compared with mining operations underground.

The accompanying statistical tables show the salient features of the metal-mining industry in the United States for the calendar year 1932, from the viewpoint of the prevention of accidents to the men employed at the mines. The figures in the tables were taken from a report entitled "Metal-Mine Accidents in the United States in 1932," now in course of publication by the United States Bureau of Mines.

TABLE 1.—ACCIDENT RATES AND MAN-HOURS OF EXPOSURE IN THE METAL-MINING INDUSTRY\* IN THE UNITED STATES IN 1932

State	Men employed	Man-hours worked	Average shifts per man	Average hours per man	Killed	Injured	Rate per million man-hours	
							Killed	Injured
Alabama	2,888	2,968,053	106	1,028	2	71	0.67	23.92
Alaska	3,149	5,993,752	238	1,903	5	214	.83	35.70
Arizona	3,750	6,181,834	206	1,648	9	300	1.46	48.53
California	5,646	10,051,955	222	1,780	25	929	2.49	92.42
Colorado	1,891	3,822,568	253	2,021	11	420	2.88	109.87
Florida	758	1,561,634	216	2,060	1	48	.64	30.74
Georgia	282	686,872	244	2,436	..	17	..	24.75
Idaho	3,232	4,989,429	193	1,544	9	403	1.90	80.77
Illinois	118	80,668	89	684	..	6	..	74.38
Iowa	123	100,535	103	817	..	8	..	79.57
Kansas	764	1,088,418	165	1,425	4	66	3.68	60.64
Kentucky	359	889,489	113	1,085	..	21	..	53.92
Michigan	7,368	11,707,925	188	1,589	5	327	.43	27.93
Minnesota	3,511	6,258,736	194	1,783	2	88	.32	14.06
Missouri	2,095	2,660,957	159	1,270	3	131	1.13	49.23
Montana	2,200	4,577,740	260	2,081	8	275	1.75	60.07
Nevada	1,345	2,263,787	210	1,683	2	122	.88	53.89
New Jersey	635	1,249,810	246	1,968	1	54	.80	43.21
New Mexico	1,442	2,816,678	247	1,953	1	153	.36	54.32
New York	960	1,441,636	188	1,502	2	40	1.39	27.75
North Carolina	176	381,337	231	2,167	..	16	..	41.96
Oklahoma	956	1,311,112	170	1,371	2	167	1.53	127.37
Oregon	334	388,396	142	1,163	..	17	..	43.77
Pennsylvania	332	227,445	73	685	..	..	..	..
South Dakota	1,473	3,829,054	325	2,599	..	183	..	47.79
Tennessee	1,096	1,944,506	202	1,774	2	53	1.03	27.26
Texas	1,237	3,341,025	331	2,701	2	114	.60	34.12
Utah	2,711	6,147,450	283	2,268	9	583	1.46	94.84
Virginia	815	1,166,011	147	1,431	1	51	.86	43.74
Washington	286	306,076	134	1,070	1	16	3.27	52.27
Wisconsin	569	1,046,794	212	1,840	..	56	..	53.50
Wyoming	41	27,383	84	668	..	..	..	..
Other States†	746	1,029,261	153	1,380	..	65	..	63.15
Total 1932	53,288	92,038,326	208	1,727	107	5,014	1.16	54.48
Total 1931	80,940	156,177,859	231	1,930	158	8,709	1.01	55.76

\* The figures also cover the mining of nonmetallic minerals other than coal but do not include the milling and smelting of ores. A separate report is published by the Bureau of Mines for mills and smelters.

† Includes Arkansas, Connecticut, Louisiana, Maine, Maryland, Massachusetts, New Hampshire, Ohio, South Carolina, and Vermont.

TABLE 2.—ACCIDENT RATES AND MAN-HOURS OF EXPOSURE UNDERGROUND IN 1932

Kind of mine	Men employed	Man-hours worked	Average shifts per man	Average hours per man	Killed	Injured	Rate per million man-hours	
							Killed	Injured
Copper	5,441	10,153,047	234	1,866	21	700	2.07	68.94
Gold, Silver, and Miscellaneous metal	13,494	26,396,453	244	1,956	52	2,464	1.97	93.35
Iron	6,975	8,242,252	141	1,182	5	204	.61	24.75
Lead and Zinc (Mississippi Valley)*	3,420	4,750,658	172	1,389	8	342	1.68	71.99
Nonmetallic mineral	1,991	2,932,961	179	1,473	2	210	.68	71.60
Total	31,321	52,475,371	207	1,675	88	3,920	1.68	74.70

\* Includes fluor spar mines in Illinois and Kentucky.

\* U. S. Bureau of Mines, No. HSS. 96.



TABLE 3.—ACCIDENT RATES AND MAN-HOURS OF EXPOSURE IN OPEN-CUT MINES IN 1932

Kind of mine	Men employed	Man-hours worked	Average shifts per man	Average hours per man	Killed	Injured	Rate per million man-hours	
							Killed	Injured
Copper	1,171	2,672,976	221	1,770	1	52	0.48	25.08
Gold, Silver, and Miscellaneous metal	313	377,655	133	1,207	..	18	..	47.66
Iron	1,607	2,729,634	175	1,699	1	30	.37	10.99
Lead and Zinc (Mississippi Valley)*	76	54,640	90	719	..	1	..	18.30
Nonmetallic mineral	2,158	3,276,114	160	1,518	..	146	..	44.56
Total	5,325	8,511,019	175	1,598	2	247	.23	29.02

\* Includes fluorspar mines in Illinois and Kentucky.

TABLE 4.—ACCIDENT RATES AND MAN-HOURS OF EXPOSURE AT SURFACE SHOPS AND YARDS AT THE MINES IN 1932

Kind of mine	Men employed	Man-hours worked	Average shifts per man	Average hours per man	Killed	Injured	Rate per million man-hours	
							Killed	Injured
Copper	2,943	6,382,398	258	2,169	1	107	0.16	16.76
Gold, Silver, and Miscellaneous metal	7,287	13,391,162	229	1,838	9	506	.67	37.79
Iron	3,372	4,936,628	152	1,464	1	30	.20	6.08
Lead and Zinc (Mississippi Valley)*	503	725,930	175	1,443	1	32	1.38	44.08
Nonmetallic mineral	2,537	5,615,818	254	2,214	5	172	.89	30.63
Total	16,642	31,051,936	210	1,866	17	847	.55	27.28

\* Includes fluorspar mines in Illinois and Kentucky.

TABLE 5.—ACCIDENT RATES AND MAN-HOURS OF EXPOSURE IN 1932 (Combined totals covering tables 2, 3, and 4)

Kind of mine	Men employed	Man-hours worked	Average shifts per man	Average hours per man	Killed	Injured	Rate per million man-hours	
							Killed	Injured
Copper	9,555	18,608,421	240	1,948	23	859	1.24	46.16
Gold, Silver, and Miscellaneous metal	21,094	40,165,270	237	1,904	61	2,988	1.52	74.39
Iron	11,964	15,908,514	148	1,331	7	264	.44	16.59
Lead and Zinc (Mississippi Valley)*	3,999	5,531,228	171	1,383	9	375	1.63	67.80
Nonmetallic mineral	6,686	11,824,893	201	1,769	7	528	.59	44.65
Total	53,288	92,038,326	208	1,727	107	5,014	1.16	54.48

\* Includes fluorspar mines in Illinois and Kentucky.

By W. W. ADAMS, L. E. GEYER, and M. E. KOLHOS, Demographical Division, United States Bureau of Mines

## Mine Accidents

STATISTICS of accidents occurring in coal mines during 1931, published by the Bureau of Mines in its bulletin No. 373, shows that injuries during the year, totaling 81,812 resulted in 1,463 fatalities, 98 permanent total disabilities, 1,773 permanent partial disabilities, and 78,478 temporary disabilities.

Progress was made in accident prevention in spite of the adverse conditions created through heavy curtailment of operations in the industry. The number of workers declined from 644,006 in 1930 to 589,705 in 1931, a reduction of 8.4 percent. The average days of operation also declined from 192 in 1930 to 168 in 1931, a reduction of 12.5 percent resulting in a decrease in the total number of man-hours worked from 1,002,691,781 in 1930 to 804,394,130 in 1931, a reduction of 19.78 percent. The number of deaths declined from 2,063 in 1930 to 1,463 in 1931, a reduction of 29.08 percent, so that the fatality rate per million man-hours worked was lowered from 2.06 in 1930 to 1.82 in 1931, a decrease of 11.65 percent. The nonfatal-injury rate was also reduced, but in less degree

—from 103.54 in 1930 to 99.89 in 1931, a decrease of 3.53 percent.

While 1,080 of the 1,463 fatalities occurred in bituminous-coal mines, 4,914 of the total bituminous-coal mines operated the entire year without a fatal accident, although they employed 60.9 percent of the workers and produced 53.6 percent of all bituminous tonnage. A distribution by states shows that the coal mines in Alaska and Michigan were operated without loss of life during the year, while the highest fatality rate was established by Indiana (3.71 per 1,000,000 man-hours worked). Alaska presented the lowest nonfatal-injury rate (28.19), and Utah the highest (153.10).

There were 1,355 fatal and 73,312 nonfatal injuries in underground operations in 1931, 78 fatal and 5,850 nonfatal injuries in surface operations, and 30 fatal and 1,187 nonfatal injuries in shaft and open-cut operations. Falls of roof or face accounted for 836 of the underground deaths and 21,733 of the underground nonfatal injuries. The next principal cause of underground injuries was mine cars and locomotives, responsible for 237 deaths and 15,437 nonfatal injuries.

## Fuller's Earth

WHILE the production of fuller's earth in the United States has increased almost phenomenally during the 38 years for which annual figures are available, declines were registered in 1931 and 1932. The quantity produced in 1932 was 252,902 short tons, valued at \$2,440,736, compared with 288,400 tons, valued at \$3,055,570 in 1931, a decrease of 12 percent in total output and 20 percent in total value. Twenty-one plants in 10 States reported production; 11 of these plants in five States east of the Mississippi River produced 178,477 tons having a total value of \$1,737,643. Contributing to this tonnage, in the order of output, were Georgia, Florida, Illinois, Massachusetts, and Alabama. Ten plants in five States (Texas, Utah, Nevada, Colorado, and California) west of the Mississippi River produced 74,425 tons valued at \$703,093.

THE Department of the Interior states that the Geological Survey is extending its potash information service from the Washington office to its offices in Denver, Colo., and Carlsbad, N. Mex. From time to time requests have been received for copies of the office records relating to the Government core tests for potash made by the Geological Survey and the Bureau of Mines under the potash act (Public 424, Sixty-ninth Congress, approved June 25, 1926). These records include the results of chemical and mineralogic examinations of the core material, logs of some of the cores, etc. They form a working collection of material that has not been prepared for general distribution but has for some time been available at the Washington office for consultation or for photostating or copying at the expense of the applicants. In response to recent requests this service is now to be extended to the western offices named.

THE forty-first annual meeting of the Illinois Mining Institute was held at Springfield, Ill., November 3.

The following were elected as officers and members of the executive committee:

**Officers:** H. A. Treadwell, president, Chicago, Wilmington & Franklin Coal Co.; C. J. Sandoe, vice president, West Virginia Coal Co.; B. E. Schonthal, secretary-treasurer, B. E. Schonthal & Co.

**Executive Board:** W. J. Austin, Hercules Powder Co.; Paul W. Beda, Old Ben Coal Co.; Paul Halbersleben, O'Gara Coal Co.; Charles F. Hamilton, Pyramid Coal Co.; Dr. M. M. Leighton, State Geological Survey; Geo. C. McFadden, Peabody Coal Co.; John G. Millhouse, Department Mines and Minerals; Fred S. Pfahler, Superior Coal Co.; E. F. Stevens, Union Colliery Co.; H. H. Taylor, Jr., Franklin County Coal Co.; T. J. Thomas, Valier Coal Co.; Paul Weir, Bell & Zoller Coal & Mining Co.

# BUREAU OF MINES

## Committee Activities

**THE SPECIAL COMMITTEE** of the American Mining Congress, on the United States Bureau of Mines, of which Mr. Eugene McAuliffe, president of the Union Pacific Coal Company, is chairman, conferred with Secretary of the Interior Ickes, on January 17, in reference to the future of the Bureau, which will shortly be transferred from the Commerce to the Interior Department. As a result of that conference, the committee submitted the following letter and statement to Mr. Ickes:

"The undersigned committee, representing the mining industry of the country through the American Mining Congress, some of the members of which called on you January 17, beg to submit this further presentation in response to your statement that suggestions as to the conduct of the Bureau of Mines and its activities would be acceptable to you.

"We, who are directly in charge of mining properties and who have benefited by the fine measure of technical advice and information provided by the Bureau since its inception, have been and are definitely concerned with the curtailment of the Bureau's activities at a time when there is unusual need of these services. We are not unmindful of your suggestion that the mining industry should blaze its own way, but the fact remains that it is even more difficult to integrate the mining industry in matters of technique than to secure concert of action in agriculture or any of the other major industries of the nation.

"After canvassing many leaders in the mining industry, nationwide, we respectfully submit the following specific suggestions with respect to changes in the administration of the Bureau:

"1. *Administration*: It is suggested that this branch of the Bureau's activities be simplified and that more time be spent in the fields by the executive officers of the Bureau.

"2. *Safety*: In practically every instance it is urged that the safety work be extended, that greater appropriations be turned over to this work, that the work be consolidated and not spread out so thinly, and that the Bureau shall act as a leader and instructor in safety.

"3. *Statistics*: That this work be maintained as is, that a vigorous protest should be made against any transfer of this division to any general statistical division of the government, and that more prompt publication of such statistics be made possible.

"4. *Experiment Stations*: That this be curtailed and that instead of the heretofore existing wide-flung experimental work it be concentrated in, if possible, four major experimental stations—one in the coal fields, the Pittsburgh station; one in the West for the metal industry; one in the Southwest for the oil group; and one in the Southeast for the clay group.

"5. *Research*: It is recognized by the mining industry that research work is highly important, that the Bureau can carry on much research work that the industry is not equipped to carry on.

"We wish to further mention the necessity at this time for extending aid to the prospector and small scale miner through the direction of competent engineers and mining men in the mineralized areas of the United States. It is very essential that there should be afforded the maximum of encouragement and assistance at this time in the finding and developing of strategic minerals such as nickel, tin, platinum, manganese, chromium and mercury, and also gold.

"This work is so essential in viewing the future and so necessary at this time in providing additional employment that we consider an allocation of Public Works funds, to be expended by the Bureau of Mines over a period of 18 months from the present time to June 30, 1935, through an organization of field men under the administration of the Bureau of Mines, as most vitally needed.

"The detail of our suggestion in this matter of finding and developing additional minerals is hereby attached as a separate exhibit. The suggestions submitted are general in nature but we shall be ready at any time to elaborate in more specific detail plans for any or all of these activities.

"In thanking you for the privilege of the interview granted us January 17, we wish to assure you that we, through the American Mining Congress, hold ourselves subject to call at any time we can be of service to you in this or any similar matter.

Very respectfully yours,  
EUGENE MCAULIFFE,  
Chairman, Bureau of Mines  
Committee, the American  
Mining Congress.

### COMMITTEE

EUGENE MCAULIFFE (*Chairman*), President, Union Pacific Coal Company.  
ROBERT E. DWYER, Vice President, Anaconda Copper Mining Company.  
R. C. ALLEN, Vice President, Oglebay Norton and Company; President, Lake Superior Iron Ore Association.  
IRVING BALLARD, Secretary, National Quicksilver Producers Association.  
RALPH M. ROOSEVELT, Vice President, The Eagle-Picher Lead Company; President, American Zinc Institute.  
MILTON H. FIES, Vice President, DeBardeleben Coal Corporation.  
E. A. HOLBROOK, Dean, School of Mines, University of Pittsburgh, representing Coal Mining Institute of America.  
HOWARD I. YOUNG, President, American Zinc, Lead and Smelting Company; President, the American Mining Congress.  
(Signed) J. F. CALLBREATH, Secretary, the American Mining Congress.

### STATEMENT

*Suggested activities looking to relief from unemployment in the basic mining industry in which thousands of employees have been and are being carried on payrolls without productive returns.*

"The mining industry is the only great industry which has not asked for or received any direct governmental aid during the great business depression. The recent advantages to gold and silver were inspired by national needs and, while the gold producers are exceedingly happy and the silver producers appreciate the apparent desire to return silver to its money uses, yet neither of these benefits were designed as a remedy for the burdens borne by them for many, many years.

"The mining industry has suffered to a greater degree than many other industries which have been aided as great governmental expense, to the cost of which the mining industry must largely contribute.

"Our present request is for expenditures designed to increase taxpaying ability, which will reduce unemployment and which will guard the nation's emergency requirements.

"We beg to submit the following activities as the request of the mining industry of the United States for the purposes above set forth:

"1. *Strategic Minerals*: Evolving practical economical technology for utilizing domestic deposits of essential peace and war-time minerals now imported in large quantities, which deposits have been considered either too low in grade or too small in extent to exploit. This work should be started immediately in order to give the necessary time to solve the problems involved and thus develop a new technology for use in time of national crisis.

"2. *Gold*: Providing the necessary information and devising technological methods that will insure the development of the full potentiality in the United States for gold production.

"3. *Publications*: Keeping the mining industry continually informed concerning the results of investigations bearing on the mineral industry through government publications, so that as progress is made industry may take advantage of any new developments.

"4. *Available Mineral Supply*: Providing a national inventory of the known reserves of essential minerals and a definite plan for their conservation and economic utilization.

5. *War Needs*: For many years the defense agencies of our government have been concerned as to the available supply of essential war materials but have been limited to studies of such facts as have been developed by other agencies. The activities herein suggested should be made to respond to the need of the War and Navy Departments, to round out and give proof of partially developed information concerning these essentials of government defense.

"To accomplish these purposes it is proposed:

"(a) To enlarge the field activities of the Bureau of Mines and thereby assist in relieving unemployment among technical men.

"(b) To station engineers in each mining district who have had experience in local or similar problems with detailed instructions as to which mineral deposits or technical problems they are to investigate in order that their work will fit into the national program.

"(c) That such engineers shall be available for the instruction and direction of prospectors and small mining development enterprises unable otherwise to secure technical advice, and thus to make employment for many now subjects of government aid.

"Attention is also called to the fact that during the normal year of 1926 the Bureau of Mines appropriations amounted to \$1,875,010, while the appropriations for the Department of Agriculture were \$124,774,441. During that year (1926) the mining industry paid in income taxes to the Federal government \$161,136,456, while the agricultural industry paid only \$35,152,152.

The agricultural industry cost the government sixty-seven times as much as the mining industry and paid to the government approximately one-fifth as much as the mining industry.

Respectfully submitted,  
Bureau of Mines Committee,  
The American Mining Congress.

EUGENE MCAULIFFE,  
Chairman.

ATTEST:

(Signed) J. F. CALLBREATH,  
Secretary.



Chas. H. Segerstrom  
President, Nevada-Consolidated Co.,  
Elected to Board of Directors of the  
American Mining Congress

The American Mining Congress is now supplementing its "Special Committee" with an Industry-wide Committee, and the following representative mining men have been invited to participate in the movement, and to organize state committees to confer with the Mining Congress:

WASHINGTON—Milnor Roberts, head of Mines Dept., University of Washington, Seattle.

OREGON—Robert M. Betts, president and manager, Quicksilver Syndicate and Cornucopia Mines Company, Blackbutte.

CALIFORNIA—Walter W. Bradley, Division of Mines, San Francisco.

IDAHO—Frederick Burbidge, Spokane Wash.

PENNSYLVANIA—(Bituminous) E. A. Holbrook, dean, School of Mines, University of Pittsburgh, Pittsburgh; (Anthracite) James Prendergast, president, Susquehanna Collieries Company, Cleveland, Ohio.

MARYLAND—Dr. J. J. Rutledge, chief mining engineer, Maryland Bureau of Mines, Baltimore.

VIRGINIA—Lee Long, vice president, Clinchfield Coal Corporation, Dante.

WEST VIRGINIA—Chas. E. Lawall, director, School of Mines, West Virginia University, Morgantown.

ARKANSAS—Heber Denman, president, Paris-Purity Coal Company, Paris.

MICHIGAN—S. R. Elliott, The Cleveland-Cliffs Iron Company, Ishpeming.

OKLAHOMA—J. G. Puterbaugh, president, McAlester Fuel Company, McAlester.

MONTANA—Wm. B. Daly, assistant manager of mines, Anaconda Copper Mining Company, Butte.

WYOMING—Eugene McAuliffe, president, Union Pacific Coal Company, Omaha, Nebr.

UTAH—Otto Herres, assistant manager, United States Fuel Co., Salt Lake City.

COLORADO—Robert S. Palmer, Secretary, Colorado Metal Mining Fund, Denver.

ARIZONA—P. G. Beckett, vice president and general manager, Phelps Dodge Corporation, Douglas.

NEW MEXICO—E. H. Wells, president, New Mexico School of Mines, Socorro.

TRI-STATE—George W. Potter, general superintendent of mines, The Eagle-Picher Lead Company, Picher, Okla.

ILLINOIS—T. J. Thomas, president, Valier Coal Company, Chicago.

WISCONSIN—W. N. Smith, general manager, Vinegar-Hill Zinc Company, Platteville.

MINNESOTA—Carl Zapffe, manager of iron ore properties, Northern Pacific Railway Company, Brainerd.

INDIANA—Robt. H. Sherwood, president and general manager, Central Indiana Coal Company, Indianapolis.

OHIO—H. E. Nold, professor of mine engineering, Ohio State University, Columbus.

KENTUCKY—K. U. Meguire, president, Dawson-Daylight Coal Company, Louisville.

TENNESSEE—Walter F. Pond, state geologist, Tennessee Division of Geology, Nashville.

ALABAMA—Milton H. Fies, vice president, Debardeleben Coal Corporation, Birmingham.



# PERSONALS

EUGENE MCAULIFFE, president of the Union Pacific Coal Company, Omaha, Nebr., who is chairman of the Special Bureau of Mines Committee of The American Mining Congress, with members of his committee, conferred with Secretary of the Interior Ickes January 17, on the work of the Bureau. It is well known that the administration intends to transfer the Bureau from the Commerce Department to the Interior Department.

HOWARD I. YOUNG, president, American Zinc, Lead and Smelting Company, St. Louis, Mo., was in Washington during the month on matters relating to the work of The American Mining Congress, of which he is president. He also attended the hearings on the lead and zinc codes, held early in January.

REPRESENTATIVES of the quicksilver industry have been in Washington for the greater part of January preparing for their code hearing on February 2. Among those who will appear for the industry are: W. R. Moorhead, general manager, New Idria Quicksilver Mines, Inc.; H. W. Gould, of H. W. Gould and Company, San Francisco; C. N. Schuette, mining engineer, and Irving Ballard, secretary, National Quicksilver Producers Association.

COLONEL WARREN R. ROBERTS, chairman of the board, Roberts & Schaefer Company, Chicago, was in Washington on code matters the latter part of January. He expects to leave soon for a short vacation at Miami, Fla.

C. M. MODERWELL, well known Illinois coal man, is a frequent Washington visitor. He is assisting the government in its Public Works Administration activities, and is chairman of the Central West Division.

AMONG the visitors at the offices of the American Mining Congress during January were the following: H. J. Byler, president, American Petroleum Institute; R. J. Ireland, Jr., Owl Creek Coal Company; Dr. H. Foster Bain, of the Copper and Brass Research Association; V. P. Geffine, the Cleveland-Cliffs Iron Company; C. B. Mapes, president, Mid-Continent Oil & Gas Company; W. D. B. Motter, Jr., Chile Copper Company; S. Livingston Mather, the Cleveland-Cliffs Iron Company; J. W. Allen, Inspiration Consolidated Copper Company; and Dean E. A. Holbrook, University of Pittsburgh.

CLINTON H. CRANE, president, St. Joseph Lead Company, sailed recently for Europe.

G. D. COWAN, president, Bell & Zoller Coal & Mining Company, is spending a short mid-winter vacation at Miami, Fla.

W. MONT FERRY, Silver King Coalition Company, Park City, Utah, was a Washington visitor early in January.

D. J. CALLAHAN, president, Callahan Lead-Zinc Company, has returned to Idaho after spending several months in Washington, New York and Chicago.

CHARLES E. SEGERSTROM, president, Nevada Massachusetts Company, of Sonora, Calif., and director, the American Mining Congress, presented a paper on the present gold situation to the western meeting of the National Chamber of Commerce.

P. C. THOMAS, vice president, Koppers Coal Company, is a frequent Washington and Cincinnati, Ohio, visitor.

L. N. THOMAS, vice president, Carbon Fuel Company, attended the conferences of bituminous operators in Washington in January.

FRANK G. FREY, formerly acting head of the Anthracite Institute, has accepted an executive position with M. A. Hanna & Company to take effect early in February.

S. B. JOHNSON, president, Lorain Coal & Dock Company, Columbus, Ohio, who has been seriously ill since early December, is now reported improved and is expected to return to his office about March 1.

GEORGE REED, vice president, Peabody Coal Company, is expected to return from Florida, where he has been taking a short vacation at his physician's direction, in time for the NRA meeting in Washington, on February 12.

ELECTION of officers for Walter Bledsoe & Company, Terre Haute, Ind., at their annual meeting in January, was as follows: Walter Bledsoe, president; C. G. Hall, vice president and general manager; R. L. Reed, vice president; L. A. Davison, vice president; H. M. Ziv, vice president; and Earl Shagley, secretary and treasurer.

FRED LEGG was elected president and Fred Heitzman, vice president, at the annual meeting of the Central Frog and Switch Company. Mr. Legg is president of the Logan and Kanawha Coal Company; Mr. Heitzman, Cincinnati manager for the Old Ben Coal Corporation.

F. W. BRAGGINS has been appointed sales manager for the Hanna Coal Company, Cleveland, Ohio.

P. R. BRADLEY, president of Alaska Juneau Gold Mining Company, has returned to San Francisco, from a tour of inspection to Juneau, Alaska.

WILLIAM KOERNER, general manager of the Magma Copper Company, Superior, Ariz., has been elected governor of the Arizona Chapter of the American Mining Congress, to succeed Mr. Michael Curley, of Ajo, Ariz.

PHILIP D. WILSON is now associated with Pardners Mines Corporation as mining engineer, with offices at 230 Park Avenue, New York City.

ALAN M. SCAIFE has been appointed chairman of the board of the Pittsburgh Coal company, vice W. G. Warden.

JOHN E. NELSON has been made general manager of the northern ore mines of the Republic Steel Corporation, succeeding the late Francis J. Webb.

D. D. MUIR, JR., vice president and general manager, United States Smelting, Refining & Mining Company, Salt Lake City, Utah, has returned to his office after a three weeks' trip in the East. In Washington Mr. Muir conferred with government officials regarding the silver and lead industries.

J. A. SWART, recently with the Roan Antelope, is now doing engineering work for the U. S. Geological Survey at Quartzite, Ariz. He is the son of W. G. Swart of the Mesabi Iron Company at Babbitt, Minn.

FRANK AYER, formerly general manager of the Moranci Branch, Phelps Dodge Corporation, and now general manager of Roan Antelope, located at Luanshya, Northern Rhodesia, has had added to his duties the supervision of Mufulira which has recently started into production.

SCOTT G. LAMB, of the Anthracite Institute, 19 Rector Street, New York City, has been named agent of the Federal Surplus Relief Corporation by Harry L. Hopkins, president. Mr. Lamb succeeds Frank G. Frey.

# HAVE YOU HEARD—?

A REPORT showing the salary schedule of executive officers and directors of corporations engaged in interstate commerce, with capital or assets of more than \$1,000,000, is being prepared by the Federal Trade Commission, under Senate Resolution 75. Tabulations have already begun on the data received from a questionnaire sent out on this subject.

THE U. S. BUREAU OF MINES reports that coke production last year totalled 27,551,913 net tons as compared with 21,788,730 tons in 1932 and 33,483,886 tons in 1931.

ACCORDING to former Assistant Postmaster General O'Mahoney, franked mail used by members of Congress costs taxpayers \$1,019,621 a year, and government departments as a whole escape payment of \$14,315,414 annually.

JOHN L. LEWIS, president United Mine Workers, at their international convention, urged miners to demand shorter hours and more pay rather than fight machines. The miners maintained that mechanical loading devices have thrown thousands of miners out of work.

A SURVEY made by the Census Bureau shows a rise in combined national debt to \$36,822,004,000 in 1932 from \$4,850,460,000 in 1912, an increase of 659 per cent. The report covers all states, 3,062 counties, 16,660 cities, boroughs, towns and villages, 128,661 school districts, 19,769 townships and 26,430 other civil divisions; and states that the national government's share of debt in 1932 was \$19,225,532,000.

ACCORDING to the *Wall Street Journal*, the League of Nations monthly bulletin of economic statistics, giving general indexes of industrial production for November compared with year ago, shows increase for Canada amounted to 6 percent, Sweden 15 percent, Germany 14 percent, Japan 13 percent, United States 12 percent, France and Russia 10 percent, and England 2 percent; indexes based on 1928 as 100 percent place United States production at 66 percent, the lowest of countries reported, France at 84 percent, England 92 percent, Sweden 95 percent, Japan 138 percent and Russia 237 percent.

THE LEAGUE OF NATIONS, economic department, has announced that the depression has been world wide, starting at slightly different times, and that for the world at large the deepest point occurred at just the middle of 1932. They state that recovery has been in progress since then but at various paces.

IN ADDRESSING 150 sales representatives of his company on January 26, H. G. Dalton, chairman of the Youngstown Sheet & Tube Company, Cleveland, stated that there is definite proof of business recovery, and that 1934 will be a much better year than 1933 for the steel industry.

THE GENERAL ELECTRIC COMPANY was presented on February 1 with a gold medal by the American Institute of the City of New York "for pioneering in industrial research."

BASED ON EVIDENCE produced at hearings during the past five months, Senator Black, chairman of the Senate committee investigating ocean and air mail contracts, stated in a recent radio speech that the government must either abandon subsidies, operate the lines itself, or completely revise the federal aid system.

DON ROSE, general counsel of the Pittsburgh Coal Company, has been elected a director, taking the place of the late R. B. Mellon.

A RESOLUTION urging a federal tax on gas, oil and water-power to enable coal to maintain its place in competitive field was presented at the recent meeting of the United Mine Workers of America, at Indianapolis. This resolution was based on the contention that increased uses of other

fuels have thrown 300,000 miners out of work and destroyed substantial investments in mines and miners' homes.

SECURITIES ISSUES, totalling more than \$19,000,000, have been made public by the Federal Trade Commission. These issues, filed for registration under the Securities Act, represent such businesses as groceries, gold mining, rubber products, investment trusts, lumber, and real estate. Approximately \$4,000,000 of the total amount is involved in proposed reorganization plans.

PROSPECTING and mining activities in Alaska have been greatly revived and stimulated by the increased price of gold and other metals during the past few months, thus creating a considerable amount of tonnage and revenue for the Alaska Railroad.

AMERICAN manufacturing activity reached its peak in 1929 with a production of more than \$70,000,000,000 worth of goods, exceeding the previous record in 1927 by one-eighth, according to the Census Bureau; the volume of output, based upon production of 1899 as 100, reached 295 in 1929 compared with 272 in 1927.

IN A PAPER read before the American Society of Engineers, Frederick H. McDonald, consulting engineer of Atlanta, Ga., envisions a nationally inter-connected power system embracing Muscles Shoals, Boulder Dam, the Columbia and the St. Lawrence rivers to serve as a system of central power reservoirs in a nationally unified, non-competitive railroad system, electrically operated and giving lowest transportation cost in history.

FORMER AMBASSADOR JAMES W. GERARD advocates that the United States be an independent commercial entity, self-sufficient and detached from the poverty of the rest of the world. Mr. Gerald holds that competition by foreign countries is ruining some of our industries.

COUNTING at the rate of 1,000 dollar bills an hour, for an 8-hour day, 300 days a year, it would take 4,166 and two-third years to complete the job of counting the ten billion dollars President Roosevelt recently asked of Congress, providing the NRA did not insist on a code reducing the working hours. This calculation was submitted to the *New York Herald Tribune* by Paul W. Barclay.

THE DAILY TREASURY statement of receipts and expenditures of the Government for January 15, the latest available, reveals that the various Government agencies have been spending so far in 1934 (15 days) at an average daily rate of \$38,446,089.

FOR THE FIRST HALF of the 1933 fiscal year total expenditures of the Government amounted to \$2,621,870,537. Receipts for this period were \$1,468,897,941 or an excess of expenditures over receipts of \$1,152,972,596. For the first half of the preceding fiscal year total expenditures were \$2,659,305,965, receipts \$1,022,885,840 or an excess of expenditures of \$1,636,420,125.

IN THE FIVE YEAR period from 1931 to the close of 1935, it is estimated that the federal government will have spent approximately thirteen billion dollars, for the sole purpose of accelerating the wheels of business, and breaking the depression. A leading daily points out that "for each minute of every day and night of the five years, the government will have spent \$4,900" . . . almost \$5,000 a minute!

IF THE PRESENT plans of the Administration are carried out President Roosevelt proposes to spend more than \$8,700,000,000 for emergency work alone, within the next 18 months. This does not include appropriations for the ordinary running of the government.

## Milling Methods

(Continued from page 26)

tailing pulp and as moisture in the concentrates. The introduction of fresh water is chiefly as spray water in the rougher lead and zinc concentrate launders.

Fresh water, as previously stated, is obtained from mountain springs and has the following analysis:

	Grains per U. S. gallon
Organic matter	7.47
Fe <sub>2</sub> O <sub>3</sub> and Al <sub>2</sub> O <sub>3</sub>	.35
SiO <sub>2</sub>	.58
CaO	6.88
MgO	3.73
SO <sub>3</sub>	5.13
Total solids	32.67

All possible water is reclaimed from thickening and filtering operations and concentrated at a convenient elevation,

## Wheels of Government

(Continued from page 18)

To protect the currency of the United States, to provide for the better use of the monetary gold stock of the United States, and for other purposes. H. R. 6976—Somers; referred to Committee on Coinage, Weights and Measures. Similar bills H. R. 6978—Steagall, and S. 2366—Fletcher; referred to Committee on Banking and Currency.

### Silver:

To broaden the monetary base by the use of silver. H. R. 6158—Cross; referred to Committee on Banking and Currency.

To provide for the free and unlimited coinage of silver. H. R. 6485—Rogers; referred to Committee on Coinage, Weights and Measures.

To authorize issuance of silver certificates. H. R. 6854—Steagall; referred to Committee on Banking and Currency.

### Taxation:

To allow the states to tax property employed and business done in interstate commerce. H. R. 6164—Swank; referred to Committee on Ways and Means.

To levy certain taxes on transaction in illegally produced crude petroleum. H. R. 6609—McClintic; referred to Committee on Ways and Means.

To provide taxation of income from tax-exempt securities. H. R. 6610, 6619.

Concurrent resolution favoring taxation of income and interest from United States securities. S. Con. Res. 6—Ashurst; referred to Committee on Judiciary.

Favoring limitation of income and wealth. S. Res. 113—Long.

To amend the Revenue Act of 1928 by addition thereto of section imposing special additional tax on profits derived from short sales of stocks, bonds, and/or other securities. S. 2371—Capper; referred to Committee on Finance.

To repeal the tax on bank checks. H. R. 7130—Lozier; referred to Committee on Ways and Means.

To confer additional jurisdiction on Board of Tax Appeals. S. 2288—Barkley; referred to Committee on Judiciary.

To amend the Constitution of the United States to permit the levying of a tax upon income derived from certain

TABLE 4.—METALLURGICAL DATA FOR FEBRUARY, 1931

Total ore treated	(tons)	10,434.20
Days operated		23
Hours operated per day		19.26
Average ore treated per 24 hours operating time	(tons)	565.29
Average number of sections operating		1
Total lead concentrate produced	(tons)	1,315.18
Average lead concentrate produced per 24 hours		71.25
Total zinc concentrate produced		1,712.62
Average zinc concentrate produced per 24 hours		92.78
Total iron concentrate produced		1,642.11
Average iron concentrate produced per 24 hours		88.96
Total concentrates produced		4,669.91
Average concentrates produced per 24 hours		252.99
Ratios of concentration, tons into 1:		
Lead circuit		7.93
Zinc circuit		6.09
Iron circuit		6.35
Combined circuits		2.23
Consumption of reagents per ton of ore treated (pounds):		
Soda ash		1.85
Sodium aerofloat		.065
Sodium cyanide		.217
Zinc sulphate		.738
Copper sulphate		1.379
Aerofloat No. 15		.100
Potassium ethyl xanthate		.314
Potassium amyl xanthate		.116

from which it is pumped to two equalizing tanks located above the mill at an elevation sufficient to permit its use in any division.

Two 6-in. Cameron pumps are used for circulating the return water, each of which is direct-driven by a 50-hp., 1,735 r.p.m. motor.

securities. H. J. Res. 222—Christianson; referred to Committee on Judiciary.

To subject certain Federal and state and other securities to income taxation. H. R. 7415—Smith; referred to Committee on Ways and Means.

Making income from United States securities subject to the income-tax laws of the United States. H. R. 7245—Celler; referred to Committee on Ways and Means.

### Labor:

To restore the purchasing power and to renew the faith and confidence of the Federal employe in Government, to uphold and support the President in his declaration for an increased wage scale, and for other purposes. H. R. 5555.

To provide a 30-hour week for industry and for other purposes. H. R. 7202—Connery; referred to Committee on Labor.

To establish a 6-hour day for employes of carriers engaged in interstate and foreign commerce, and for other purposes. H. R. 7430—Crosser; referred to Committee on Interstate and Foreign Commerce. Similar bill: S. 2518—Black.

To provide old-age compensation for the citizens of the United States. H. R. 7019—Disney; referred to Committee on Labor. Similar bills: H. R. 7050—Connery; S. J. Res. 65—Long; H. R. 712—Ellenbogen; H. R. 7207—Swank.

To regulate employment of persons under 18 years of age. H. R. 6184—Rich; referred to Committee on Labor.

To correct errors regarding prima facie provisions respecting codes and supplements, and to continue in effect original provisions concerning same. H. R. 6486—Harlan; referred to Committee on Revision of Laws.

### Public Lands:

To divert lands unsuited for profitable agriculture to productive forestry uses. H. R. 7416—Fulmer; referred to Committee on Agriculture.

Making an appropriation to restore water of high mineral content on public lands. H. R. 6366—Morehead; referred to Committee on Claims.

To authorize exchange of Government lands for state lands. S. 2090—King; referred to Committee on Public Lands and Surveys.

To provide for the granting of public

lands, including the minerals therein, to the states in which they are located, subject to certain terms, conditions, reservations and exceptions, and also subject to acceptance by each individual state; etc. S. 2395—Erickson; referred to Committee on Public Lands and Surveys.

To amend an act entitled "An act to amend the act of Congress," approved March 3, 1927 (44 Stat. L. 1364), being an act to amend section 10 of the act entitled "An act extending the homestead laws and providing for right-of-way for railroads in the district of Alaska and for other purposes," approved May 14, 1898; H. R. 6182—Dimond; referred to Committee on Judiciary.

To amend act for leasing of coal lands in Alaska. H. R. 6179—Dimond; referred to Committee on Public Lands.

### Anti-Trust:

To amend and reenact Anti-Trust laws. S. 1980—Long; referred to Committee on Judiciary.

### Commerce:

To prevent interference with interstate or foreign commerce. S. 2247, 2248.

To prevent frauds in commerce. H. R. 6213—Huddleston; referred to Committee on Interstate and Foreign Commerce.

To aid commerce. H. R. 6362—Glover; referred to Committee on Rivers and Harbors.

To protect commerce against bribery. S. 2275—Robinson; referred to Committee on Judiciary.

### Imports:

To levy additional tariffs on imports from countries which are in default on war debts to the United States. H. R. 6167—Knutson; referred to Committee on Ways and Means.

### Assessment:

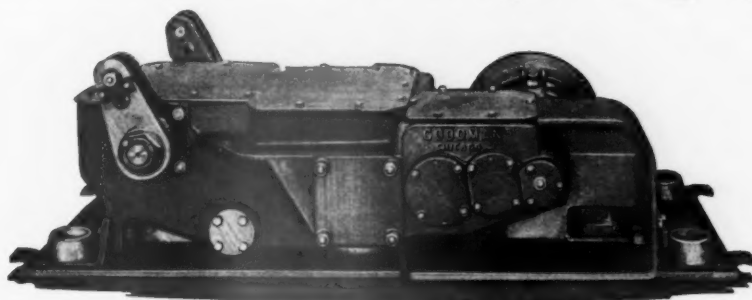
To provide for the suspension of annual assessment work on mining claims. H. R. 6569—Carter; Committee on Mines and Mining. Similar bills: H. R. 7472—Murdock, and S. 2313—Borah; referred to Committee on Mines and Mining.

### War Minerals:

To amend section 5 of the Act of March 2, 1919, generally known as "War Minerals Relief Statutes." H. R. 7238—Vinson; referred to Committee on Mines and Mining.

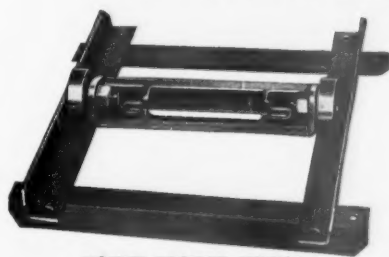


# Modern Shaker Conveyor Equipment



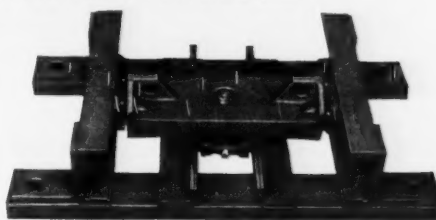
**UNIVERSAL SHAKER CONVEYOR DRIVE. TYPE G-20**

Back slip of coal is eliminated. Self lubricating. All gears run in oil. Drives efficiently with a Duckbill. Large skid plate with bar lugs. Choice of three motions. 20,000 pounds pull.



**SILENT TROUGH SUPPORT**

The Goodman Silent Ball Bearing Roller Trough Support is quiet and efficient. Its smooth operation combined with its light weight and suitability for all conditions make it a favorite with the men.



**GUIDE FRAME—HEAVY TYPE**

The Guide Frame carries the weight of the trough on anti-friction bearings and is provided with suitable extensions for roof jacks.



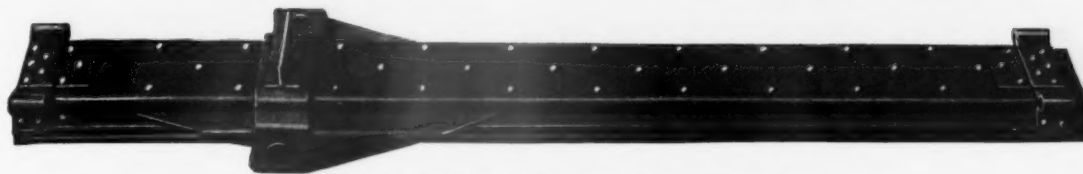
**BALL JOINT PULLER ROD**

The Ball Joint Puller Rod was designed to give flexibility between the drive and the connecting trough. It is efficient and gives long life.



**PONY TRUCK**

A handy and convenient carrier which travels right on the pan line. Indispensable for transporting timber, material and supplies to the face.



**CONNECTING TROUGH—TYPE Uof-10—FULLY REINFORCED**

Made of copper-bearing steel, dimple riveted and fully reinforced. May be used with any type drive coupled on the side, underneath or on the end.

## Something to inquire about!

### MECHANICAL CAR PULLER

Designed for economical movement of cars under the end of the conveyor. No electric or air power is used. No gathering locomotives are needed. No back-breaking man power is necessary. A pull of the rope does the trick. Power is supplied by the reciprocating motion of the pan line.

### CHAIN OR BELT CONVEYORS

Face, chamber and mother conveyors with several improvements which provide flexibility of operation and low maintenance costs. Belt and chain designs are available in all lengths and sizes.

**GOODMAN** MANUFACTURING COMPANY  
HALSTED ST. at 48<sup>TH</sup>.  
CHICAGO --- ILL.  
**Locomotives - Loaders - Coal Cutters**  
PITTSBURGH - WILKES-BARRE - HUNTINGTON, W.VA. - BIRMINGHAM - ST LOUIS - DENVER

# NEWS OF MANUFACTURERS

**T**HE U. C. C. All-Service Gas Indicator is the latest addition to the gas indicating equipment of The Linde Air Products Company, New York, N. Y. It supplements two other indicators, the U. C. C. Methane Detector and the U. C. C. Combustible Gas Indicator. The new indicator has been designed primarily for the manufactured gas industries, although many other fields will find it of equal value.

It does three things: (1) Indicates how flammable or explosive an atmosphere is; (2) shows the presence of poisonous gases and vapors; and (3) indicates any deficiency of oxygen.

It can be used with absolute safety for testing manholes, locating underground leaks, and in purging. Like the earlier instruments it is equipped with a body harness, is simple to operate and is complete and ready for instant use.

City and state departments for sewer inspection and emergency police and fire works, oil companies for purging equipment and testing tanks and tank cars, shipyards for testing tankers, and chemical industries should find it of the greatest value.

**I**N RECENT TESTS, a new vacuum-contact, auxiliary-potential relay, developed by the General Electric Company, closed and interrupted a five and one-half ampere, 250-volt direct-current circuit ten million times without requiring any maintenance. The relay, designated as type HBA, is intended for use in atmospheres which may contain explosive gases. It is particularly suitable for application in coal mines, oil refineries, flour mills, and grain elevators.

The equipment, which is enclosed in a steel container, has single-pole, double-throw contacts located in a heavy-walled glass tube, from which the air has been evacuated. At one end of the tube is a metal bellows. A movable contact is connected to the bellows and operates between two stationary contacts. Normally, one contact is closed and upon the application of energy to the coil the normally-closed contact opens and the normally-open contact closes.

The relay ratings are 15 amperes continuous, 10 amperes interrupting at 115 and 230 volts, 60 cycles and 125 and 250 volts direct current.

**T**HE Traylor Engineering and Manufacturing Company, Allentown, Pa., announces the opening of a new District Office at Little Rock, Ark.—address P. O. Box 748—to serve Western Tennessee, Arkansas, Louisiana, Texas, Oklahoma and Kansas, in charge of Mr. B. W. Traylor, who has been connected with the company for a great many years and is expert in all of the many lines of crushing, cement, lime, mining and metallurgical machinery manufactured by the Traylor Company.



**I**N THE PAST, Gas Masked Crews, working in smoke and fume-filled locations, have been seriously handicapped by the lack of quick and ready communication, the ordinary mask preventing the proper transmission of the voice.

This has not only prevented the proper coordination between the men but has prevented warnings of impending danger to firemen in smoke-filled rooms.

It is believed that greater safety and easier communication for these gas-masked crews now has been made possible by the development of the new MSA Speaking Diaphragm Facepiece by Mine Safety Appliances Company of Pittsburgh, Pa.

This mask definitely eliminates the muffling effect of the regular facepiece when talking, a special diaphragm being built into the mask directly in front of the mouth.

According to the manufacturers, speech is transmitted naturally and without distortion and when necessary, permits clear speech over a telephone or speaking tubes as in the case of Army and Navy officers whose duties require them to give commands direct or through field telephones or speaking tubes aboard ships.

In smoke-filled rooms, fire officers are also able to quickly direct firemen without signalling, misunderstanding or delay in execution of commands—the voice being directional, allowing easy location of men.

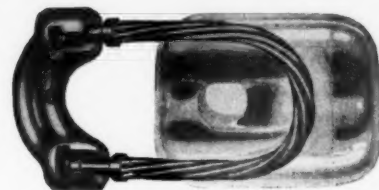
The facepiece of the new MSA mask is available in either black or white rubber, making it possible for an officer to assume his proper identity with his men.

In the petroleum industry the white rubber facepiece is particularly advantageous to men engaged in mixing Ethyl gasoline or any spotting by the Ethyl fluid can be readily distinguished.

The mask is equipped with a deflector tube of aluminum for best efficiency and a regulation time-tested flutter valve.

**S**O AS TO DEVELOP the full strength of porcelain strain insulators, the Ohio Brass Company has designed a new line of fittings which will accommodate all of the various sizes and makes of standard strain insulators. The new fittings consist of a yoke and a length of stranded cable, each end of which is flash-welded to a turned ball-terminal. Due to the fact that the strand conforms perfectly to the contour of the insulator, it is possible to develop the full strength of the porcelain. This statement becomes quite clear when it is understood that the flexible strand bears equally on the porcelain at all points, as compared to the point contacts of a rigid fitting.

As shown in the accompanying illustration, the yoke has two sockets into which the terminals fit. The opening in these sockets is placed so as to eliminate the possibility of uncoupling under impact or when the strain on the fittings is suddenly released. In addition to this



the top of the socket is recessed to receive the ball of the terminal under recoil, making the assembly doubly fool-proof against uncoupling. To make certain that all of the strands are properly welded to the terminals, each weld is given a rigid proof test. Yokes are available with or without either an eye or a clevis for attachment directly to pole bonds or to such equipment as frogs and crossovers.

**A**S AN ADDITION to the Oxweld line of welding and cutting apparatus, The Linde Air Products Company, 30 East 42nd Street, New York, has introduced a new stationary cutting machine known as the Pantosec. Being a precision shape-cutting instrument, it is especially suitable for cutting dies, cams, and other parts that must be smoothly and accurately cut. With a cutting range of 44-inch longitudinally and 20-inch laterally, it does straight-line cutting, angle cutting, beveling, circle-cutting and intricate shape-cutting. It requires a floor space of only 72 x 83 inches.

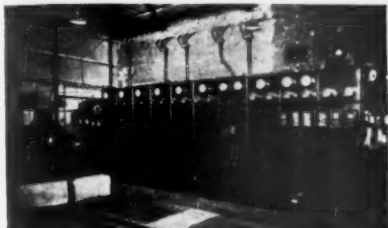
**A** NEW BULLETIN has just been published by the Sullivan Machinery Company on Portable Furnaces. It gives in concrete form the essentials which make up a good furnace, as well as the manner in which the Sullivan furnace fulfills the requirements.

## Power Distribution for Anthracite Coal Mines

(Continued from page 19)

10,000 hp. connected load, of which 7,275 hp. operates under ground.

To supply power to inside pumps, hoists, and fans, there are four feeder panels in No. 2 shaft substation. Each panel is equipped with an oil circuit breaker, ammeter, induction type overload relays, current transformers, and disconnecting switches. These panels control four 400,000 cm., 3-conductor, 5,000-volt, lead-covered power cables which are supported in the shaft by soft wooden clamps fastened to the shaft



No. 6 Shaft Sub-station Switchboard

timbers. At the top pump station these cables terminate at panels equipped for reverse power trip, so that any cable will be switched off in case of trouble. Three outgoing panels equipped with overload trip control three 300,000 cm., 3-conductor, 5,000-volt cables which

terminate at panels equipped for reverse power trip at the counter pump station.

Two panels equipped with overload trip in the counter pump station control two 300,000 cm., 3-conductor feeding to the shaft bottom station, where they terminate in panels equipped for reverse power trip. At each pump station individual switchboard panels control each pump, and other panels control cables feeding to hoists and fans. For further increase in load under ground at No. 2 shaft, additional feeder cables will be run direct from the surface to the bottom of the shaft and will not enter the pump station switch rooms with the present cables as the pump station switch rooms have no space for additional switches and the present cables are adequate for the future pumping load at the top and counter stations.

MALCOLM MUIR, Division Administrator of the National Recovery Administration and one of the chief aides of General Johnson since the inception of NRA, has resigned from his position with the Administration to devote his full time to his duties as president of the McGraw-Hill Publishing Company in New York. Under the direction of Mr. Muir nearly 100 codes, approximately one-half of all those which have been approved by the President, have been adopted by the major industries of the country.

W. A. HARRIMAN, chairman of the board of the Union Pacific Railroad, on January 11, took his place as a Division Administrator in charge of Division II,

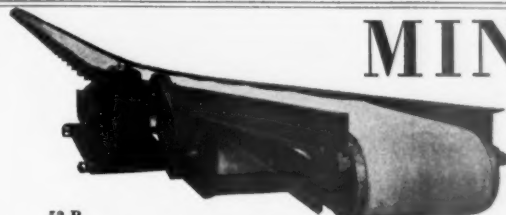
succeeding Malcolm Muir, resigned. Mr. Harriman accepted the appointment with the understanding that he will serve only until May 1, in accordance with the Administration's policy of rotating key positions.

THE Annual Mining Institute was held at the Mines Department, University of Washington, throughout the week beginning Monday, January 22. This institute, which has now reached its seventh year, is a successor to the winter mining session, a form of instruction that originated at the University of Washington during the gold rush of 1896. The university staff gives instruction in the form of lectures and demonstrations in the mill and other laboratories. Each day a mining engineer who is prominent in the industry gives an address on a special topic. The sessions are held in Mines Laboratory and Guggenheim Hall. They are open to everyone interested, and are free of charge.

THE Monongahela Valley Coal Mining Institute held its annual meeting on December 12. James F. Rockett was elected president, and an address was delivered by C. E. Lawall, School of Mines of the University of West Virginia.

M. L. GARVEY has moved to Washington, D. C., from Charleston, W. Va., where he will be associated with the executive force of the Pocahontas Fuel Company.

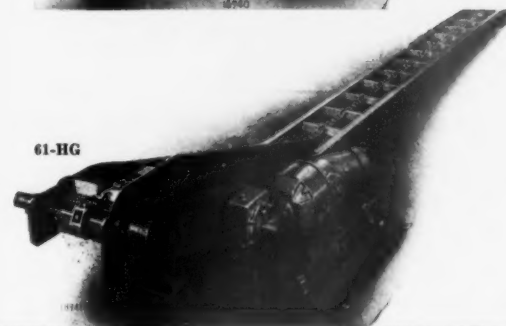
## MINE CONVEYORS



52-B



61-AM



61-HG

Jeffrey manufactures a complete line—chain and belt types—portable and sectional—for the room, face and entry.

The 52-B Belt Type Entry Conveyor receives coal from the various room conveyors—discharges into pit cars in the cross entry. Extended to any length up to 1,500 feet. The 61-AM is a chain type sectional room conveyor—capacity  $\frac{3}{4}$  ton per minute. Maximum length—300 feet.

The 61-AE Elevating Conveyor—eliminates the necessity of taking more top over mine cars than is necessary. Height under discharge end and length of overhang may be varied to suit conditions by inserting intermediate sections. The 61-HG Face Conveyor—Intermediate section—5 feet in length, permitting conveyor to be extended to any length up to 90 feet. Capacity—up to 2 tons per minute.

Catalog No. 570-C covers the complete line of Jeffrey Mine Conveyors. Send for it now!

### The Jeffrey Manufacturing Company

958-99 North Fourth Street, Columbus, Ohio

Sales and Service Stations: Pittsburgh, 803 Grogan Bldg.; Scranton, 122 Adams Ave.; Terre Haute, Ind., 319 Cherry St.; Birmingham, 1625 2nd Ave. S.; Winchester, Ky., 122 N. Main St.; Salt Lake City, 1070 Bryan Ave.; and Beckley, W. Va., 193 City Ave.

JEFFREY MANUFACTURING CO., Ltd., of Canada

Head Office and Works: Montreal  
Branch Office: Toronto; Service Station, 210 9th Ave., Calgary

(Patented and Pats. Pending)



61-AE





... the dependable quality and performance of National Pyramid brushes stand out. Heavy and prolonged overloads must be carried. Cold, ice and snow increase operating difficulties. Peak demands occur in many industries.



## NATIONAL PYRAMID BRUSHES

*meet these exacting demands and keep the wheels of industry turning*

OUR THOROUGHLY TRAINED REPRESENTATIVES  
ARE ALWAYS AT YOUR SERVICE

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### ADVERTISING INDEX

	Page		Page
Atlas Powder Co.....	8	Loftus, Peter F.....	54
Goodman Mfg. Co.....	51	Mott Core Drilling Co.....	4
Grasselli Chemical Co., The.....	6	National Carbon Co., Inc.....	54
Haney, Marshall .....	54	Ohio Brass Co.....	3
Hercules Powder Co.....	4	Pennsylvania Drilling Co.....	54
Hoffman Bros. Drilling Co.....	54	Pierce & Co., Jas. H.....	54
Jeffrey Mfg. Co., The.....	53	Robinson Ventilating Co.....	4
Lake, M. C.....	54	Roebling's Sons Co., John A.....	5
		Universal Vibrating Screen Co.....	4

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Our specialty—Testing bituminous coal lands  
Satisfactory cores guaranteed



**We Look Into the Earth**  
By using Diamond Core Drills.  
We prospect Coal and Mineral  
Lands in any part of North or  
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COAL CONVENTION  
and EXPOSITION

*for the PRACTICAL Operator*

*And PRACTICAL operators will make plans now to attend their largest convention of the year—because they are always ALERT—alert for information on new developments—new methods and practices—that will reduce production costs or increase efficiency. They know that the most authentic material on newly-proved and time-tested practices will be presented at the convention by fellow PRACTICAL operators—giving and suggesting solutions of new problems created by the coal codes.*

*And present indications point to the largest exposition of heavy mining equipment and supplies since 1929—demonstrating that manufacturers have kept pace with the demand for lower cost producing machines and supplies.*

*Every coal company should send as many men as possible to the 1934 convention and exposition and you can now arrange for reduced railroad fares by writing THE AMERICAN MINING CONGRESS.*

*Sponsored by*

— COAL DIVISION —

THE AMERICAN MINING CONGRESS

439 MUNSEY BLDG.

WASHINGTON, D. C.



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# PREVENTABLE ACCIDENTS

*cost the coal mining industry over*  
**\$80,000,000** *every year...*

*What is your share of this  
tremendous expenditure?*

Aside from the humanitarian considerations of saving lives and preventing painful injuries, there is no better investment in preventing the tremendous expense of compensation losses than the proper mine safety safeguards. In fact, a judicious investment in the proper protective devices pays its initial cost many times over.

Statistics reveal that while the national average cost of compensation is 27 cents per ton of production, many individual mine operators have cut this cost to an average of only 1.3 cents per ton by the use of approved Mine Safety Equipment—a startling figure but nevertheless true.

Every dollar saved in accidents adds just that much to the profit side of your ledger. So make MSA your headquarters for achieving this economy,—the world's largest commercial manufacturer of mine safety appliances of every description.



## MINE SAFETY APPLIANCES COMPANY

General Offices: Pittsburgh, Pa.- District Representatives in Principal Cities

M. S. A. EQUIPMENT—Edison Electric Cap Lamps . . . Skullgards . . . Goggles . . . Safety Shoes . . . Rock Dust Distributors . . . Oxygen Breathing Apparatus . . . Self Rescuers . . . All-Service Masks . . . Gas Indicators and Recorders . . . Safety Clothing . . . Inhalators . . . First Aid Equipment . . . Safety Signs . . . Miscellaneous Mining Specialties . . . Descriptive Bulletins will be sent on request.



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